VOLUME 11 PUBLISHED JULY, 1981

SECRET CB®

FM CB

HOT 858 UPDATE

CONFIDENTIAL FACTUAL REPORT

SCHEMATICS ETC.

UPDATED QUARTERLY

BY VIC RICHTER

PRICE $15.95

www.hardtimez99.com

IMPORTANT: READ THIS FIRST

The information in this book is not to be used to exceed F.C.C. specifications, in any case, as applied to power, modulation, frequency spectrum, etc. It is illegal to do this to any CLASS D RADIO.

This book is a factual report of gathered information, and as such is intended for use on radios for EXPORT ONLY.

If you are not familiar with electronics, it is better to check for advice with your local electronics or CB center, as to restrictions, etc., concerning your radio.

More information, on other units will be forthcoming in future issues, to be published on a quarterly basis.

This book will not be found at a book store, but can be obtained through your local CB Dealer or Distributor, or by completing the order form in the book and sending to:

Selman Enterprises, Inc.
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Corpus Christi, Texas 78412

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Address any and all inquiries to:

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P.O. Box 8189
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(512) 992-1303

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SECRET CB WISHES TO GRATEFULLY ACKNOWLEDGE THE FOLLOWING PEOPLE FOR THEIR HELP AND CONTRIBUTIONS TOWARD GETTING VOLUME 11 IN PRINT. THEIR ENCOURAGEMENT AND CONTRIBUTION OF MATERIAL HAS BEEN INVALUABLE.

RAY CRAMER

JERRY HENNAN

SAM KERSH

DAVID LITTERER

GILBERT MANCAO

PAT PETKO

JERRY SMITH

MIKE STEPHENS

EMMETT WRIGHT

VIC says "THANKS" and a free book to the above people

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INTRODUCTION

Thanks for the warm comments received on "Secret CB" Volume 10. We know you are going to be just as pleased with "Secret CB" Volume 11. We have under gone somewhat of a "new beginning" and have some exciting new things coming up.

You will notice a picture of "The Trouble Shooter" on the front cover. We are now in full production and the response has been terrific. Thanks for all the orders. Currently, we are developing a live receive/transmit frequency display and a few other goodies. We will keep you informed as these developments are available in the form of refined products. We are also in the process of evaluating some new products and will have a full report in upcoming issues.

In answer to the question - Do we have a mail-in service department? - the answer is NO. One of our goals here at Secret CB is to simplify things as much as possible so the average technician can successfully do his own work and thereby make more money.

Due to the popularity of FM CB Abroad, we have included a special section on how a regular AM CB can be modified to work on FM. We also have available a high quality FM Receiver Converter Board and an FM Deviation Board specially designed for this purpose. You could set up your own repeater.....

Thanks to all the readers, experimenters, hobbyists, and contributors who have again helped us put out another book. Keep the information coming and see your name in print and receive a free "Secret CB" book.

73's

Vic Richter

Vic Richter

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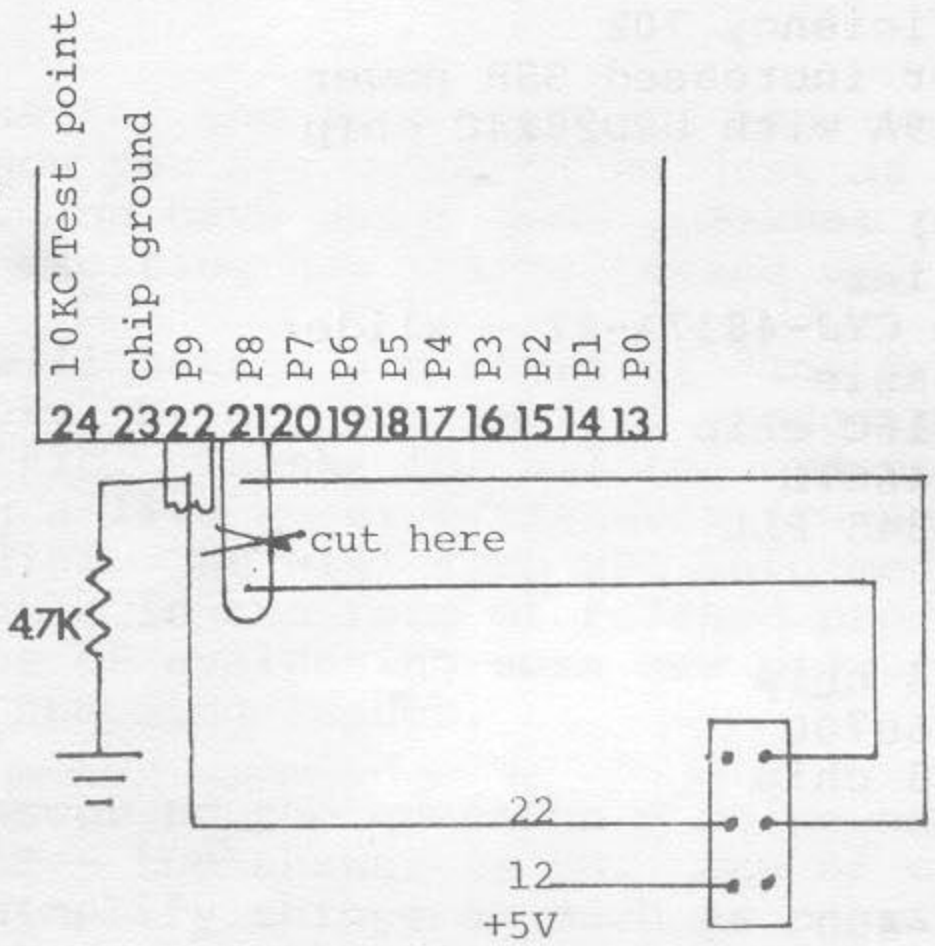
EXTRA! EXTRA! READ ALL ABOUT IT!!!

HOW TO GET ON 28 & 29 MHZ WITH THE UPD858 PLL CHIP

Here's How:



1. Isolate pin 22.

2. Install a 4.7K Ohm resistor from 22 to ground.

3. Wire up a DPDT switch as shown above. This gives channels up to 28.405.

If you really want to GET HIGH, take both pins 21, and 22 high for channel 28.965-29.405.

Taking pin 19 high also will net 29.455, on channel 8, up to 29.805 on channel 40.

Have fun with this one!

See also the following pages for more 858 goodies.

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SSB TRUTH TABLE FOR 858 CHIP

1= VCC 0= 0Volts

	PINS								
Frequency	13	14	15	16	17	18	19	20	21
26.055	0	0	0	0	0	0	0	0	0
065	1	0	0	0	0	0	0	0	0
075	0	1	0	0	0	0	0	0	0
085	1	1	0	0	0	0	0	0	0
095	0	0	1	0	0	0	0	0	0
105	1	0	1	0	0	0	0	0	0
115	0	1	1	0	0	0	0	0	0
125	1	1	1	0	0	0	0	0	0
135	0	0	0	1	0	0	0	0	0
145	1	0	0	1	0	0	0	0	0
155	0	0	0	0	1	0	0	0	0
165	1	0	0	0	1	0	0	0	0
175	0	1	0	0	1	0	0	0	0
185	1	1	0	0	1	0	0	0	0
195	0	0	1	0	1	0	0	0	0
205	1	0	1	0	1	0	0	0	0
215	0	1	1	0	1	0	0	0	0
225	1	1	1	0	1	0	0	0	0
235	0	0	0	1	1	0	0	0	0
245	1	0	0	1	1	0	0	0	0
255	0	0	0	0	0	1	0	0	0
265	1	0	0	0	0	1	0	0	0
275	0	1	0	0	0	1	0	0	0
285	1	1	0	0	0	1	0	0	0
295	0	0	1	0	0	1	0	0	0
305	1	0	1	0	0	1	0	0	0
315	0	1	1	0	0	1	0	0	0
325	1	1	1	0	0	1	0	0	0
335	0	0	0	1	0	1	0	0	0
345	1	0	0	1	0	1	0	0	0
355	0	0	0	0	1	1	0	0	0
365	1	0	0	0	1	1	0	0	0
375	0	1	0	0	1	1	0	0	0
385	1	1	0	0	1	1	0	0	0
395	0	0	1	0	1	1	0	0	0
405	1	0	1	0	1	1	0	0	0
415	0	1	1	0	1	1	0	0	0
425	1	1	1	0	1	1	0	0	0
435	0	0	0	1	1	1	0	0	0
445	1	0	0	1	1	1	0	0	0
455	0	0	0	0	0	0	1	0	0
465	1	0	0	0	0	0	1	0	0
475	0	1	0	0	0	0	1	0	0
485	1	1	0	0	0	0	1	0	0
495	0	0	1	0	0	0	1	0	0
505	1	0	1	0	0	0	1	0	0
26.515	0	1	1	0	0	0	1	0	0

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TRUTH TABLE FOR 858 CHIP (CONT)

Frequency	13	14	15	16	17	18	19	20	21
26.525	1	1	1	0	0	0	1	0	0
535	0	0	0	1	0	0	1	0	0
545	1	0	0	1	0	0	1	0	0
555	0	0	0	0	1	0	1	0	0
565	1	0	0	0	1	0	1	0	0
575	0	1	0	0	1	0	1	0	0
585	1	1	0	0	1	0	1	0	0
595	0	0	1	0	1	0	1	0	0
605	1	0	1	0	1	0	1	0	0
615	0	1	1	0	1	0	1	0	0
625	1	1	1	0	1	0	1	0	0
635	0	0	0	1	1	0	1	0	0
645	1	0	0	1	1	0	1	0	0
655	0	0	0	0	0	1	1	0	0
665	1	0	0	0	0	1	1	0	0
675	0	1	0	0	0	1	1	0	0
685	1	1	0	0	0	1	1	0	0
695	0	0	1	0	0	1	1	0	0
705	1	0	1	0	0	1	1	0	0
715	0	1	1	0	0	1	1	0	0
725	1	1	1	0	0	1	1	0	0
735	0	0	0	1	0	1	1	0	0
745	1	0	0	1	0	1	1	0	0
755	0	0	0	0	1	1	1	0	0
765	1	0	0	0	1	1	1	0	0
775	0	1	0	0	1	1	1	0	0
785	1	1	0	0	1	1	1	0	0
795	0	0	1	0	1	1	1	0	0
805	1	0	1	0	1	1	1	0	0
815	0	1	1	0	1	1	1	0	0
825	1	1	1	0	1	1	1	0	0
835	0	0	0	1	1	1	1	0	0
845	1	0	0	1	1	1	1	0	0
855	0	0	0	0	0	0	0	1	0
865	1	0	0	0	0	0	0	1	0
875	0	1	0	0	0	0	0	1	0
885	1	1	0	0	0	0	0	1	0
895	0	0	1	0	0	0	0	1	0
905	1	0	1	0	0	0	0	1	0
915	0	1	1	0	0	0	0	1	0
925	1	1	1	0	0	0	0	1	0
935	0	0	0	1	0	0	0	1	0
945	1	0	0	1	0	0	0	1	0
955	0	0	0	0	1	0	0	1	0
965	1	0	0	0	1	0	0	1	0
975	0	1	0	0	1	0	0	1	0
985	1	1	0	0	1	0	0	1	0
995	0	0	1	0	1	0	0	1	0
27.005	1	0	1	0	1	0	0	1	0

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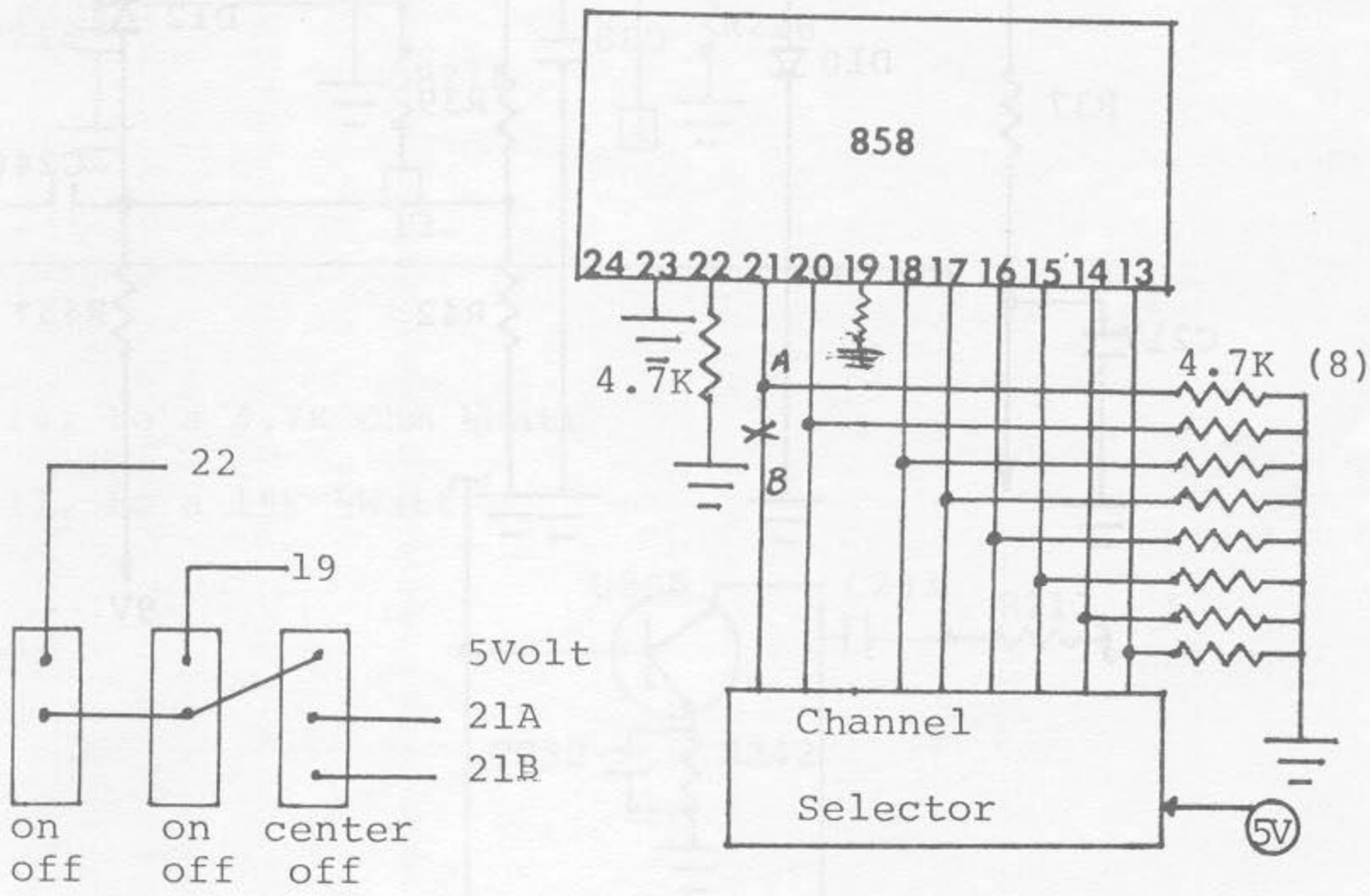
TRUTH TABLE FOR 858 CHIP (CONT)

Frequency	13	14	15	16	17	18	19	20	21
27.015	0	1	1	0	1	0	0	1	0
025	1	1	1	0	1	0	0	1	0
035	0	0	0	1	1	0	0	1	0
045	1	0	0	1	1	0	0	1	0
055	0	0	0	0	0	0	0	0	1*

*The scale of frequencies will have the same pin status as the frequencies at 26.---, after the point shown here. 27.055 has the same pin states as 26.055, except that pin 21 is now active. This progression will repeat itself as frequency increases.

If you take pin 22 high (with 21 low), you will get channels 27.965-28.405. With 19 high, you will get 28.455-28.805.

With 21 and 22 high you will get 28.965-29.405. With 19 high, you will get 29.455-29.805.



Steps to re-program 858

1. Isolate pin 19 and add 4700 Ohm ¼W carbon film resistor to ground.
2. Isolate pin 22 and add 4700 Ohm ¼W carbon film resistor to ground.
3. Cut pin 21 trace as shown above. ✕

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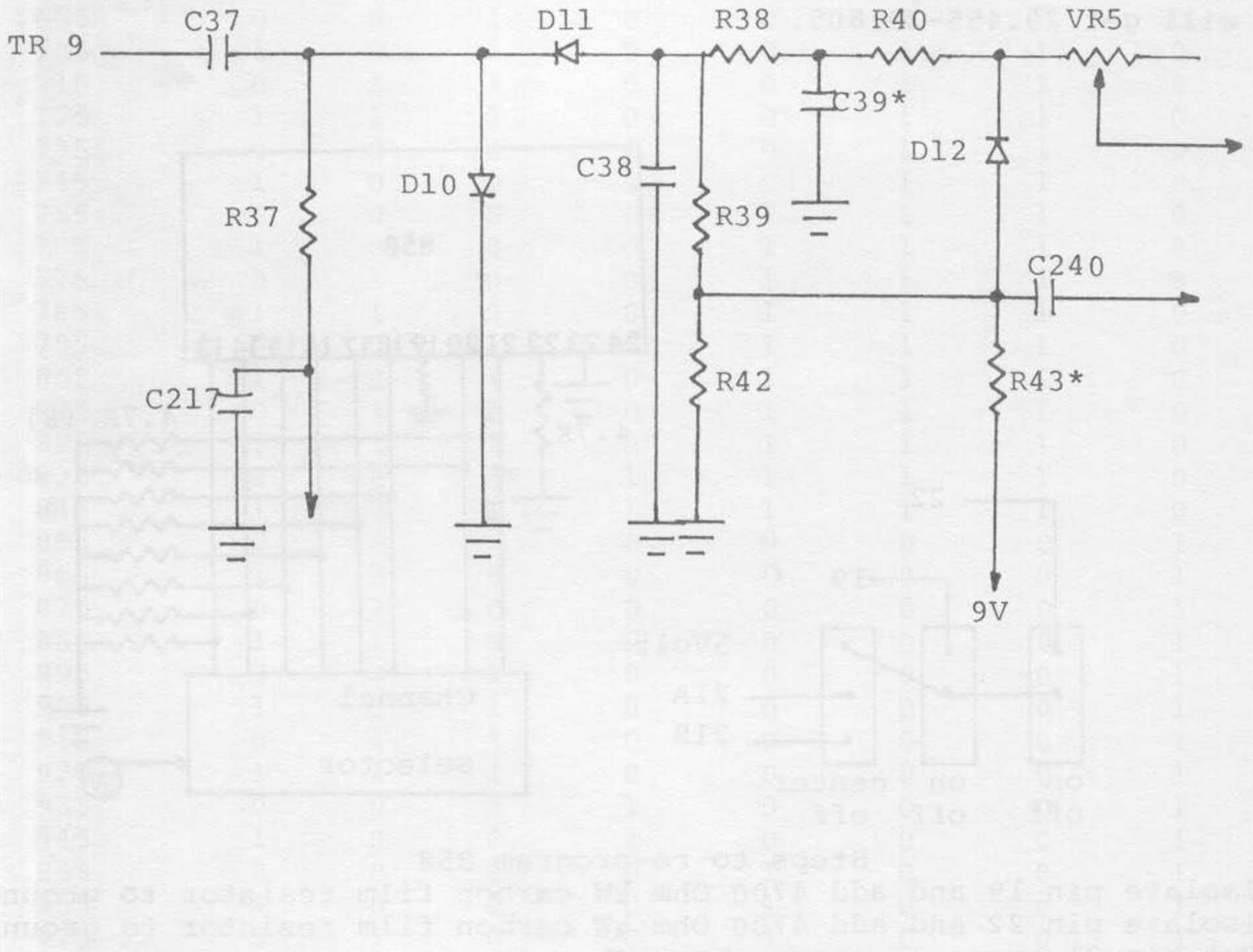
HOW TO INCREASE ANL EFFICIENCY 70%

PRESIDENT WASHINGTON, GRANT
COBRA 138XLR, 139XLR
ROBYN SB510D, SB520D
OTHER 858 UNIDEN CHASSIS

1. Remove R43, and install a 2.2M Ohm ¼Watt resistor in its place.
2. Remove C39, and install a .47uf 16Volt in its place.



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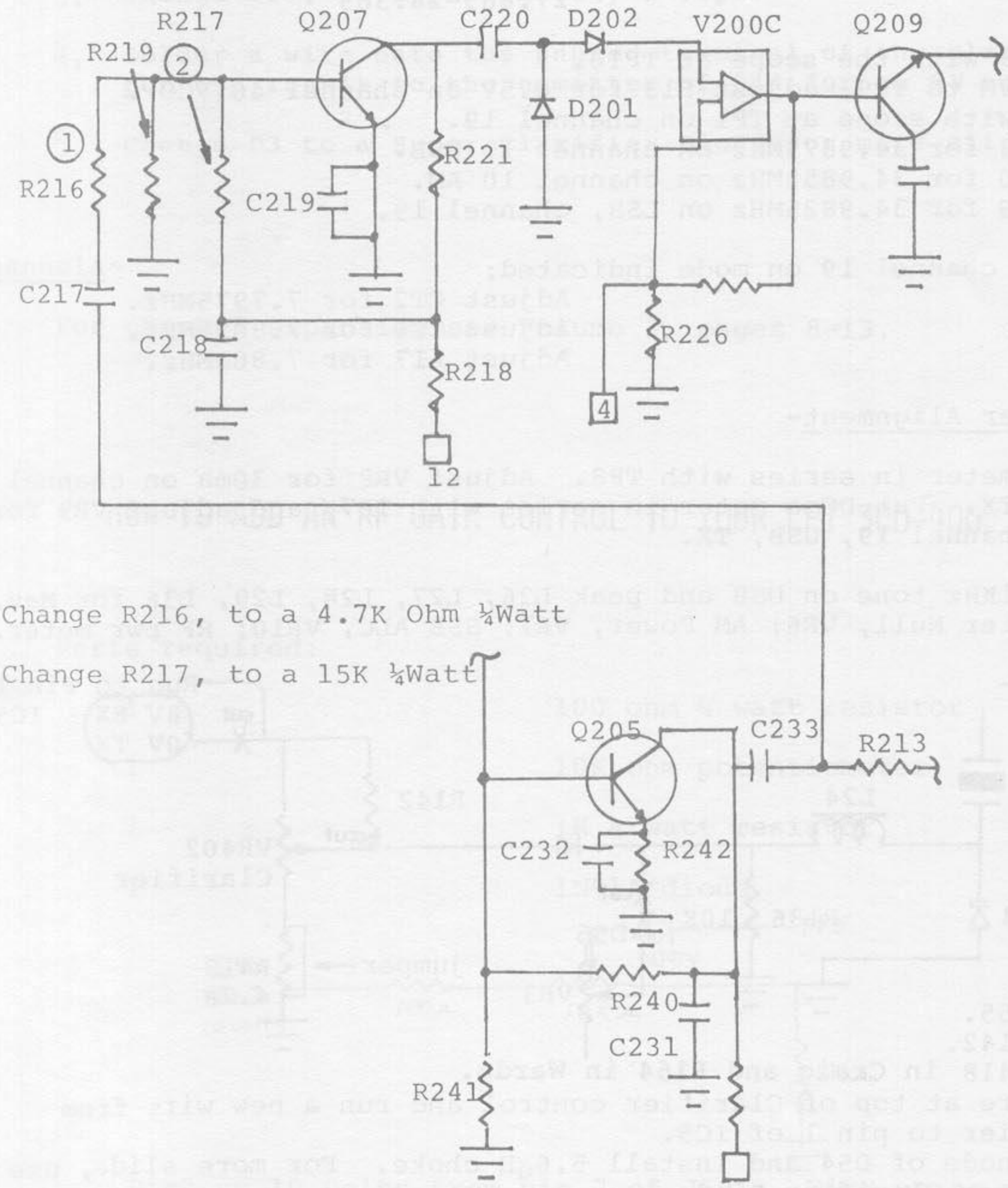
CPI ALC MODIFICATION
FOR INCREASED
SSB POWER

Rec-Xmt Board



1. Change R216, to a 4.7K Ohm ¼Watt
2. Change R217, to a 15K ¼Watt

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CRAIG L232/WARDS GEN-719A

WITH UPD2824C CHIP

The only way to convert these sets without replacing the PLL chip, is to change the X4 mixer Xtal frequency. Use the quad bilateral switch circuit shown on page 71 of this volume.

The following Xtal frequency will give you the channels indicated.

	Stock channels
11.2858	26.515-26.955
11.135	27.415-27.855
11.435	27.865-28.305
11.5868	

Adjust L18 with the scope at TP10.
Connect TVM to TP9, adjust L13 for 6.5V on channel 40(VCO).
Peak L14 with scope at TP1 on channel 19.
Adjust CT3 for 34.9875MHz on channel 19 USB.
Adjust L20 for 34.9850MHz on channel 10 AM.
Adjust L19 for 34.9825MHz on LSB, channel 19.

At TP3 on channel 19 on mode indicated;

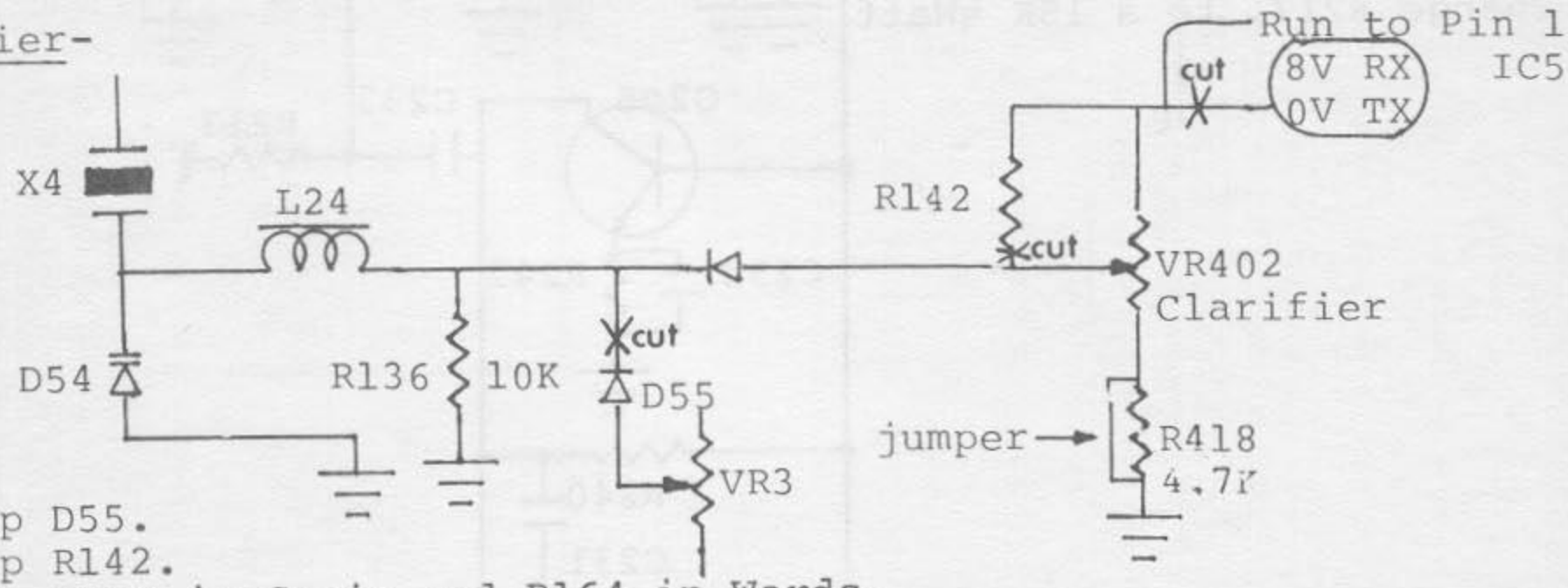
LSB	Adjust CT2 for 7.7975MHz.
USB	Adjust CT1 for 7.8025MHz.
AM, TX	Adjust L17 for 7.800MHz.

Transmitter Alignment-

Put DCma meter in series with TP8. Adjust VR8 for 30ma on channel 19, USB, TX. Put DCma meter in series with TP7, and adjust VR9 for 60ma on channel 19, USB, TX.

Inject a 1KHz tone on USB and peak L26, L27, L28, L29, L36 for Max. VR5; Carrier Null, VR6; AM Power, VR7; SSB ALC, VR10; RF pwr meter.

Clarifier-



1. Clip D55.
2. Clip R142.
3. Jump R418 in Craig and R164 in Wards.
4. Cut wire at top of Clarifier control and run a new wire from clarifier to pin 1 of IC5.
5. Lift anode of D54 and install 5.6$_{u}$H choke. For more slide, use our Super Clarifier Diode.

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HYGAIN V 02A

Slider-

1. Clip D5.
2. Clip R24.
3. Change C17, to approximately a 34pf.
4. Solder a wire onto the unused terminal of the clarifier pot and run it to the emmitter of Q44 for an 8V source.
5. Change D3 to a Super Clarifier Diode for more slide.

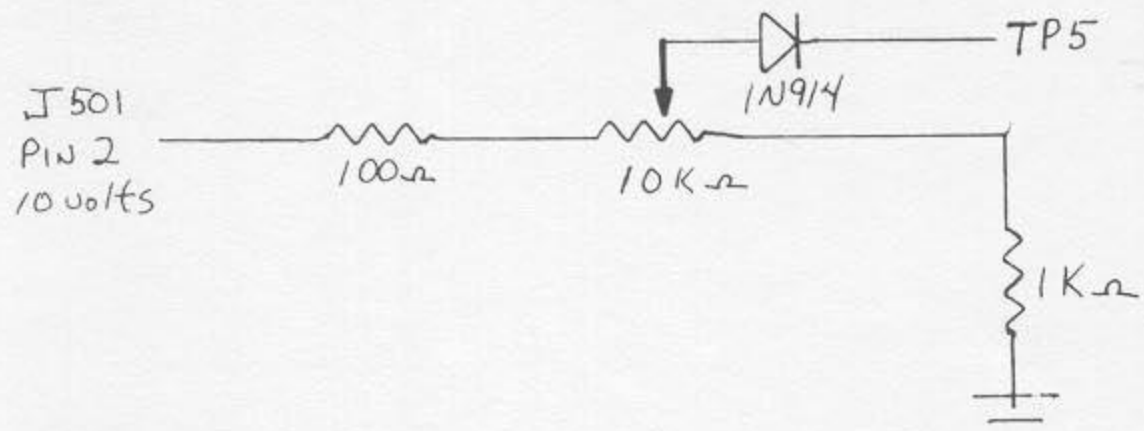
Channels-

For channel expansion see Volume 3, pages 8-13.

HOW TO ADD AN RF GAIN CONTROL TO YOUR CPI 300-400

Parts required:

1	100 ohm ¼ watt resistor
1	10K ohm potentiometer
1	1K ¼ watt resistor
1	1N914 diode



Pick up 10 volts from pin 2 of J501. Wire up as per drawing above and solder to TP5.
Mount the potentiometer where convenient.

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JOHNSON 4740 (NDC 40013)

Clarifier Modification-

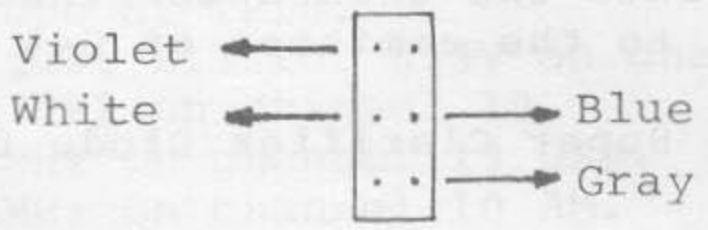
1. Remove the Blue-White wire and Gray wires from the relay and solder them together. Unit will now slide.

Frequency Expansion-

1. Remove the Yellow-White wire from channel selector boards.

2. Remove the Blue-White wire from the channel selector boards.

3. Build a switch kit as follows:



NOTE: this is a DPDT ON/ON/ON switch.

Hook-up as follows:

1. Solder Blue wire to Blue-White wire.

2. Solder Gray wire where the Blue wire was on the switch board.

3. Solder the White wire to where the Yellow-White wire was on the switch board.

Center position is normal, position 1 415-475, pos. 3 485-705.

R212; AM AMC, R728; RF Meter, R726; SSB ALC.

Adjust T701, T702, T703, T704, T705, T706.

C746; TVI

On USB, no mod., adjst T602, C617, R609, for minimum RF output.

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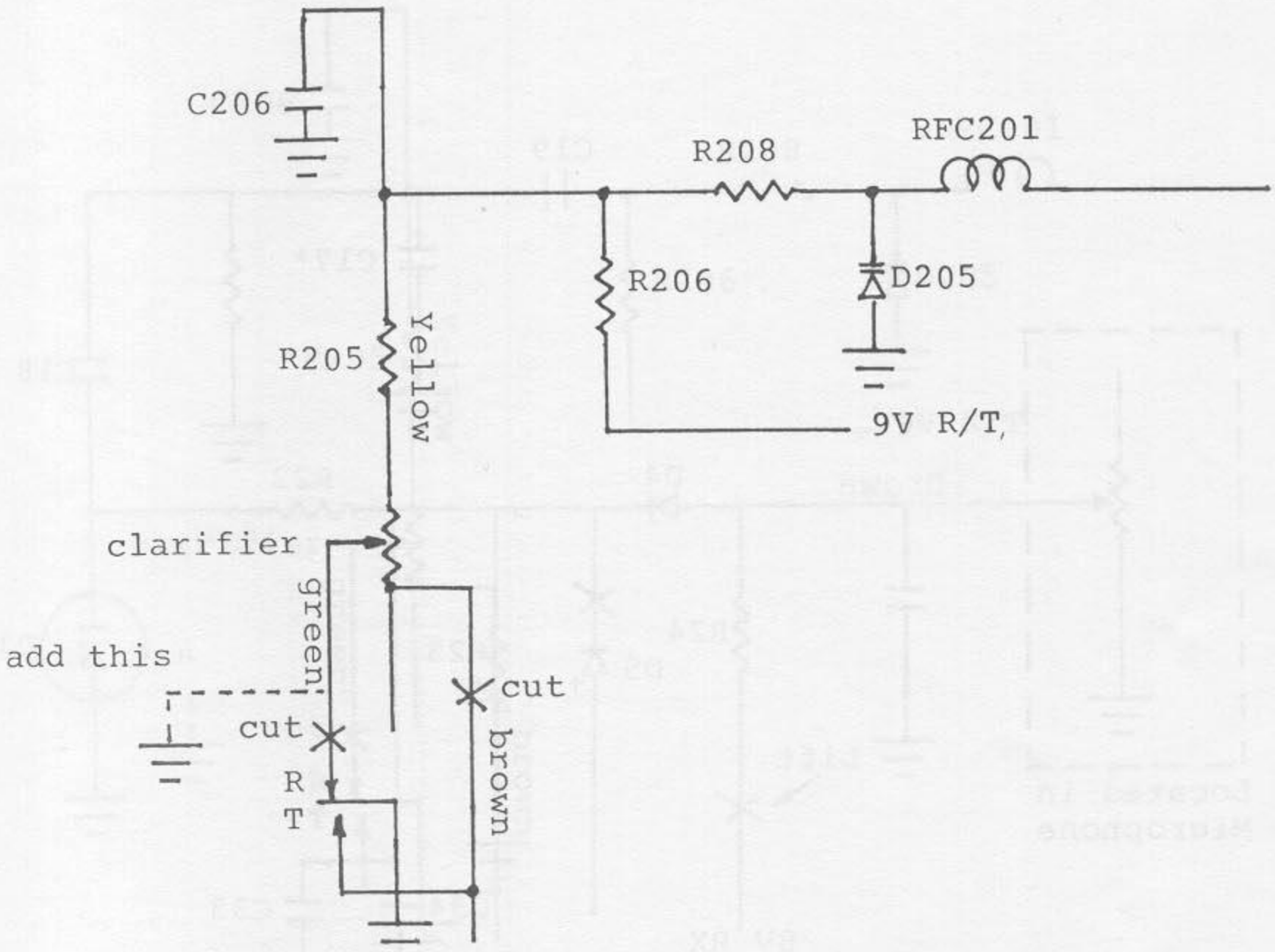
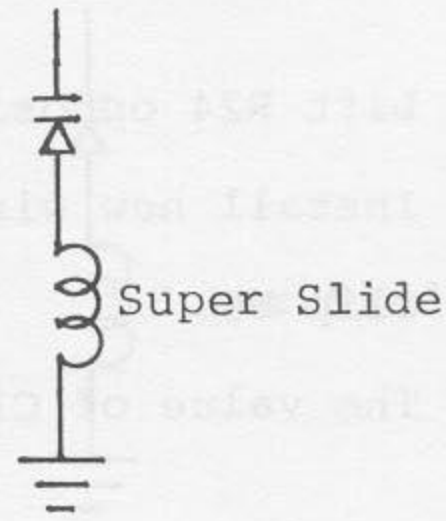
Clarifier-



Slider-

For more slide use a choke (Super Slide) in series with D205.

For maximum slide, remove C210, C208, C207, C209 capacitors.



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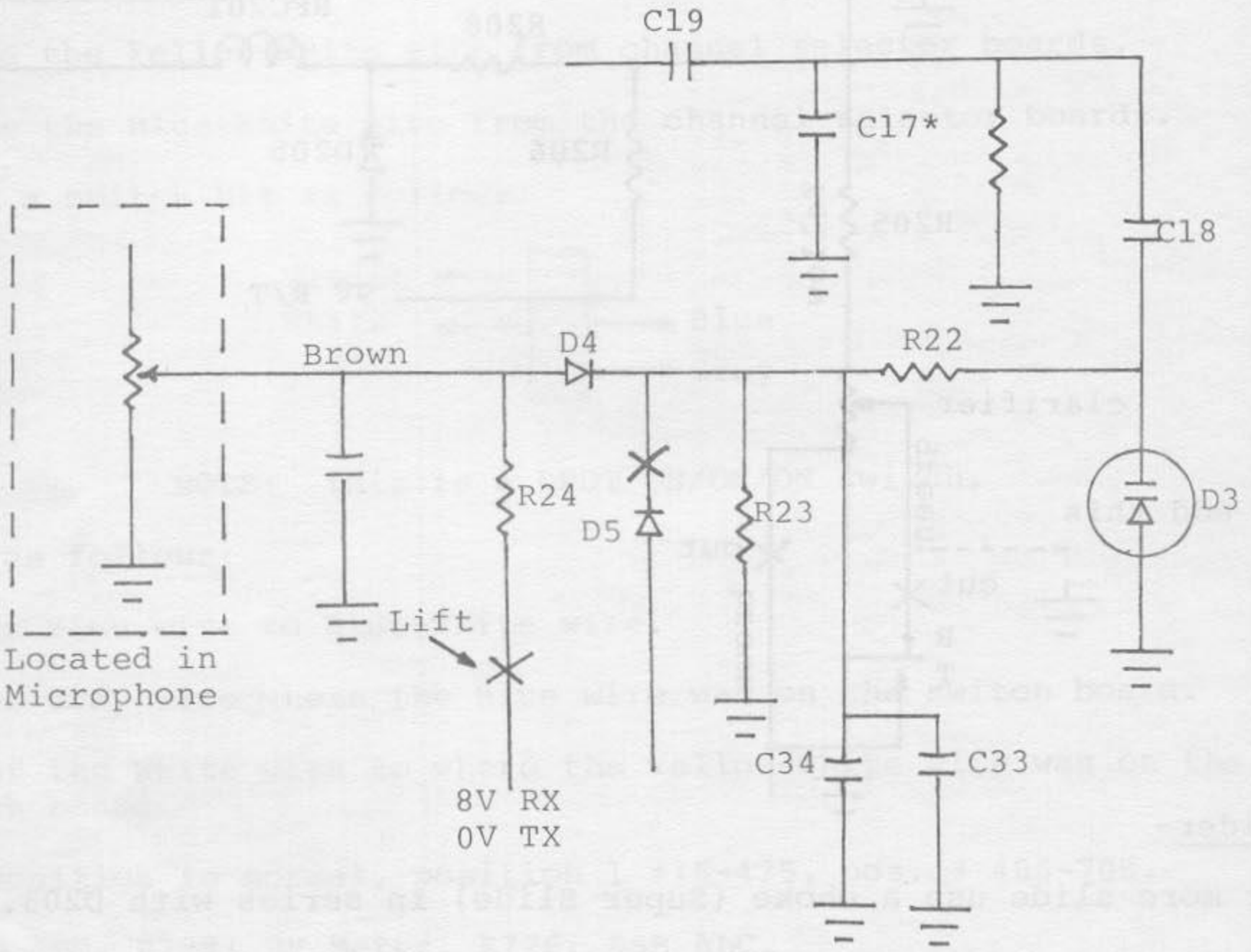
MIDLAND 79-892

TRUETONE MODEL CYJ-4837A-87 SLIDER



1. Lift R24 opposite D4.
2. Install new wire from lifted end of R24 to emitter of Q44.
3. Clip D5.
4. The value of C17 can be altered slightly for best slide.

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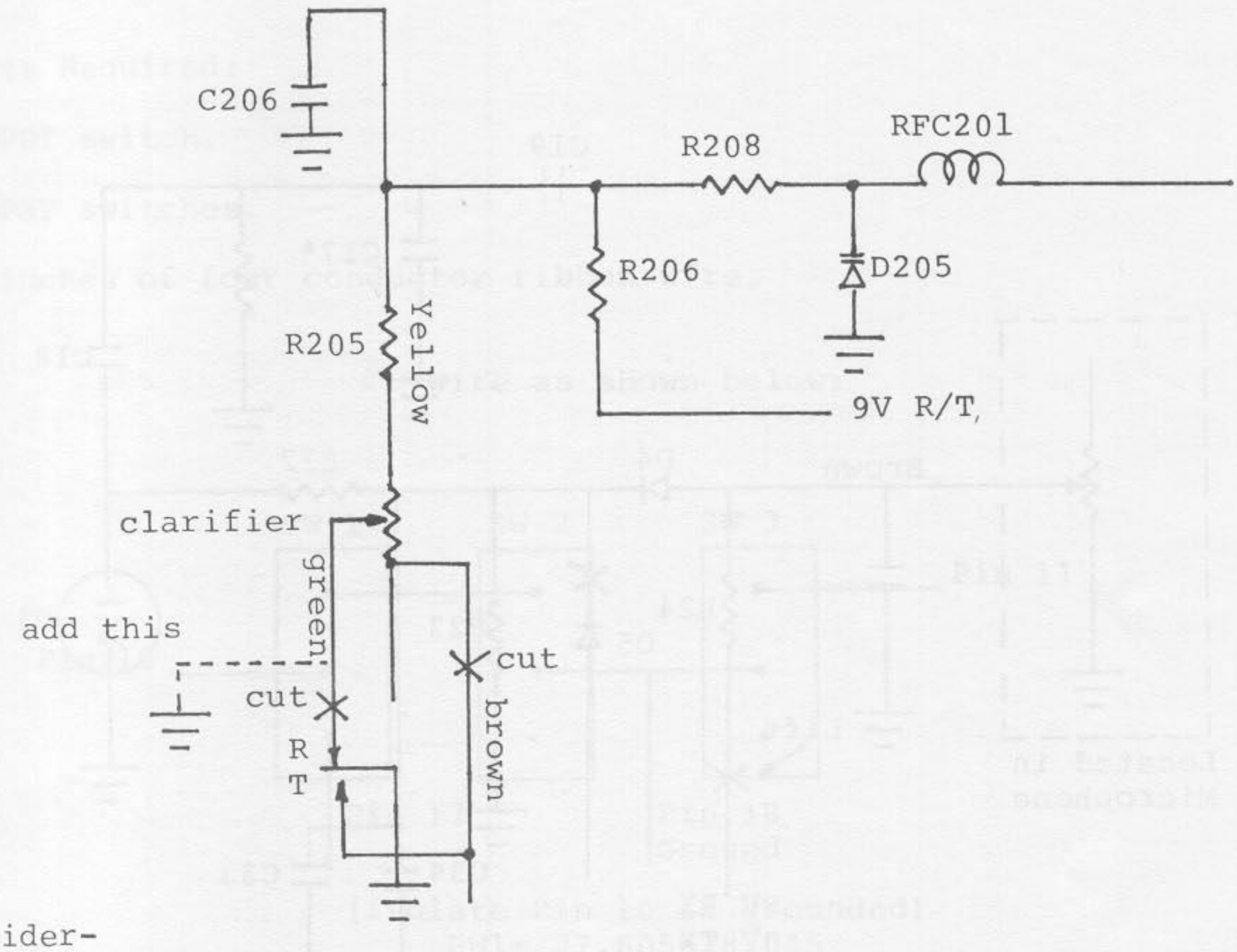
Clarifier-



Slider-

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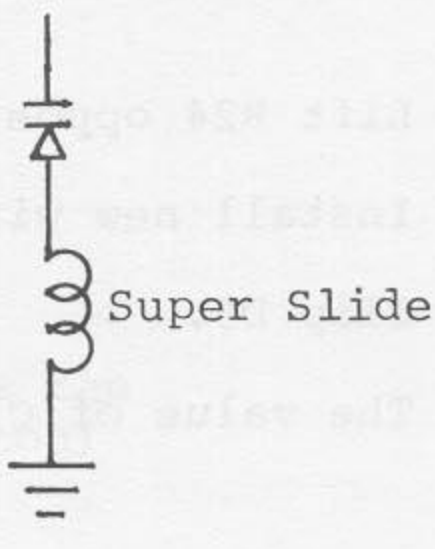
For maximum slide, remove C210, C208, C207, C209 capacitors.



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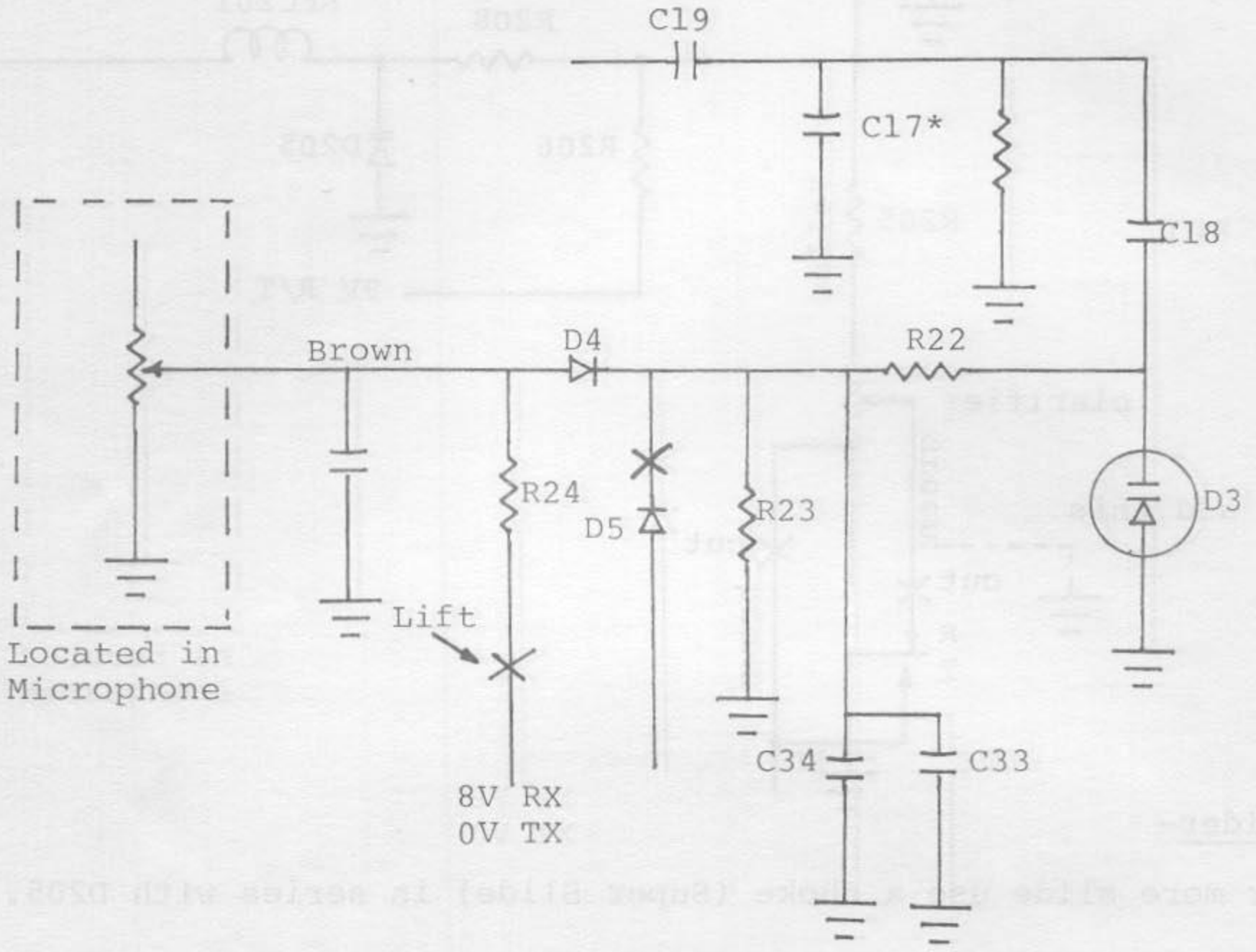
MIDLAND 79-892

TRUETONE MODEL CYJ-4837A-87 SLIDER



1. Lift R24 opposite D4.
2. Install new wire from lifted end of R24 to emitter of Q44.
3. Clip D5.
4. The value of C17 can be altered slightly for best slide.

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MB8719/11.1125 XTAL CHASSIS

HOW TO GET BOTH HI AND LO FREQUENCIES W/O XTAL CHANGE

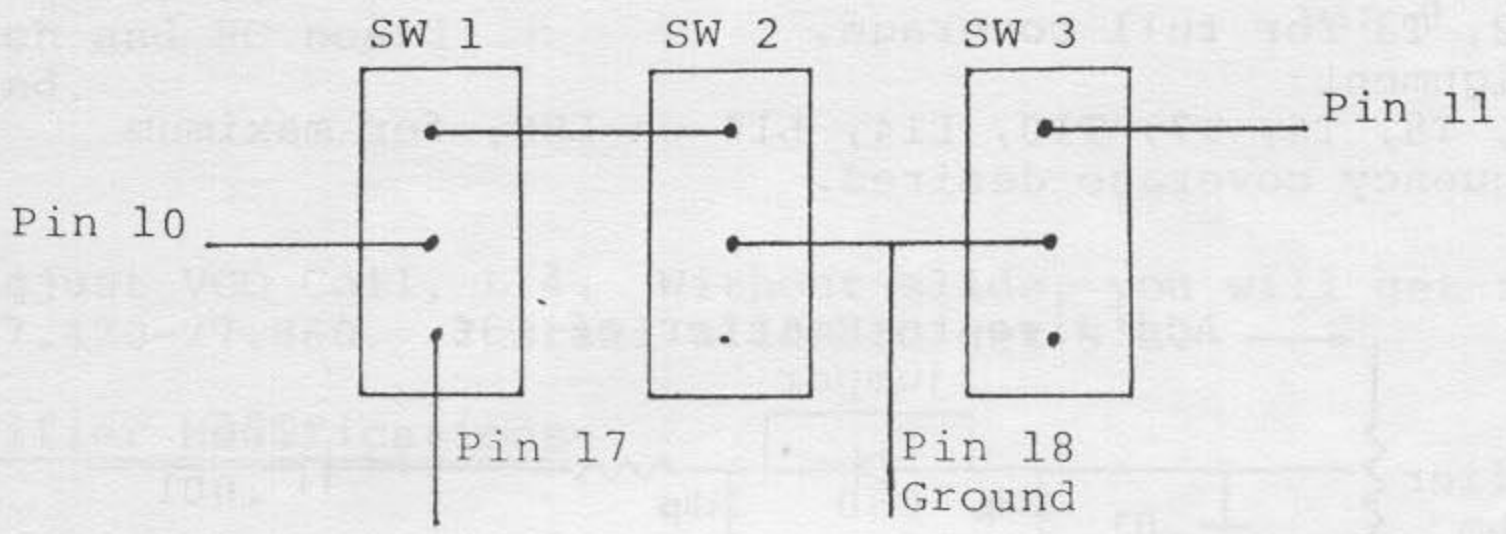
Parts Required:

1-SPDT switch.

2-SPST switches.

12 inches of four conductor ribbon wire.

Wire as shown below:



(Isolate Pin 10 if grounded)

SW1= 27.605-28.045
SW2= 26.325-26.765
SW3= 26.815-26.955
SW1+SW3= 27.455-27.725

Adjust L19 and L21 for maximum frequency coverage.

Reference: Volume 10, PP 25-31.

If you have trouble getting this mod to work, retune the tripler - VERY CRITICAL - (L18 on President Washington)

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MIDLAND 6001-7001 UPD2816C CHIP

This can be modified in two ways.

PLL Conversion-

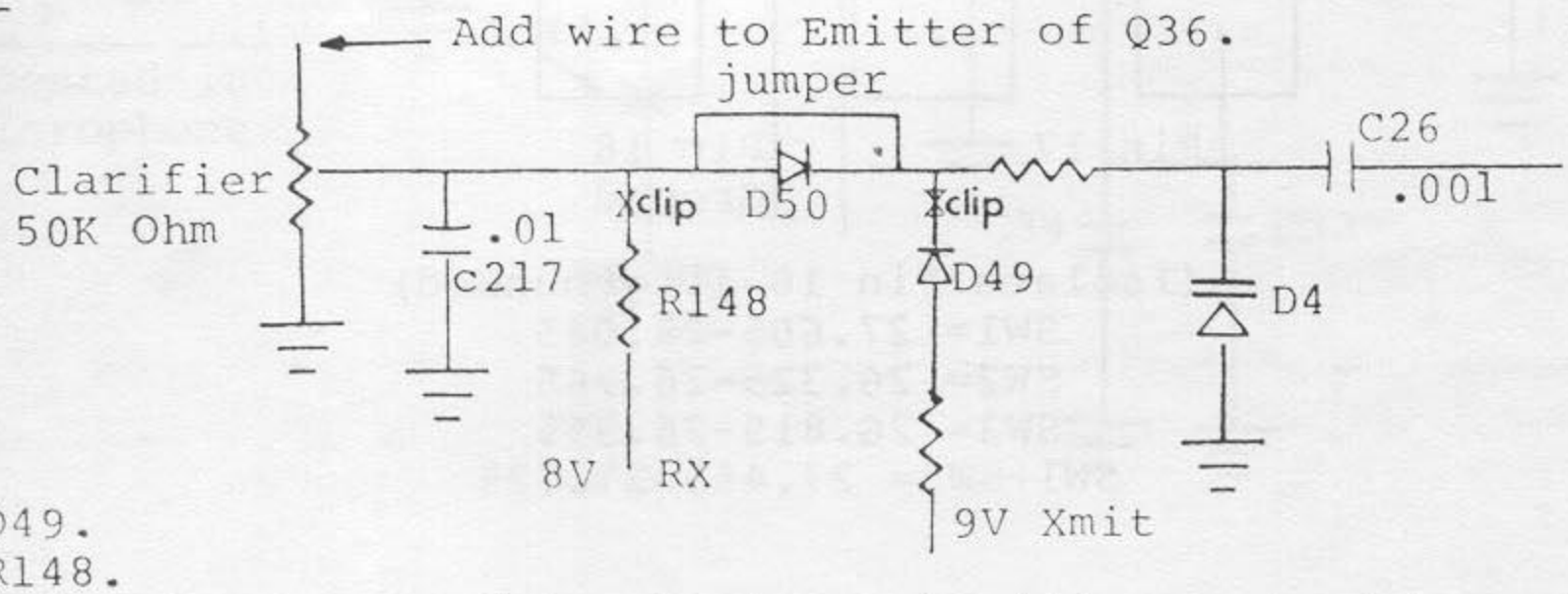
1. Unground pin 9 for low frequencies 26.510-26.950.
   Note: No time to round up a radio and try this but here it is- check it out for yourself. Unground pin 20, and check the results.

Xtal Change-

1. Remove X2, 10.4667MHz doubler cut Xtal.
2. Obtain a 10.6917 doubler cut Xtal for channels 41-85, and a 10.2417 Xtal for channels 26.515-26.955. Above information can be used in conjuction with this. Use a relay or our new electronic Xtal switcher (Kit 116), to switch the Xtals.

Readjust T1, T2, T3 for full coverage.
Transmitter alignment:
Adjust T11, T4, T5, T6, T7, T10, L14, L16 on LSB, for maximum output and frequency coverage desired.

Clarifier-



1. Clip D49.
2. Clip R148.
3. Run a wire from un-used terminal on clarifier control to emitter of Q36 (positive of C299).
4. Jump D50.
5. Install Super Clarifier Diode in place of D4.
6. Jump C27 with 22pf capacitor.
7. Remove C22 across CT3.
8. Adjust CT1: USB; CT2: AM; CT3: LSB.

VR1; Am power RV9; AM modulation RV8; SSB mod. RV10; SSB ALC.

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PRESIDENT AR144/COBRA 146GTL

(D2824 Chassis)

Here's the modification you've been waiting for!

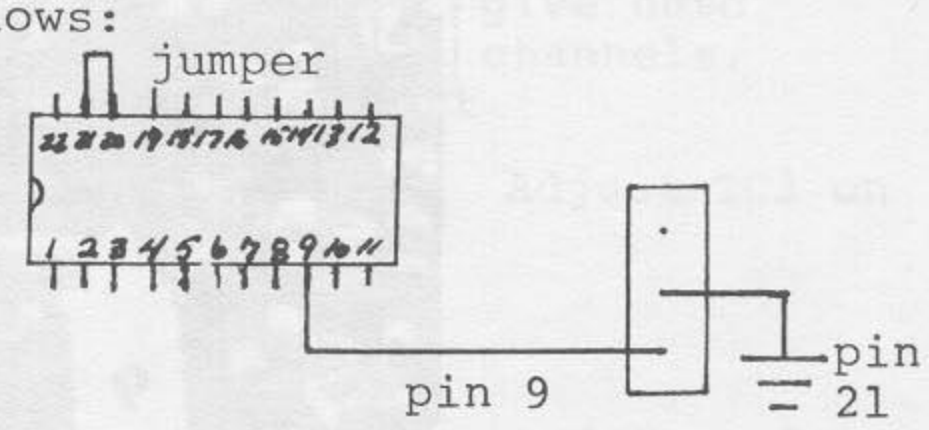
1. Unsolder and remove IC2, D2824C PLL Chip.

2. Install and solder in new D2816C Chip.

3. Connect pin 20 to pin 21 (ground).

4. Install switch and wire as follows:

Run a wire from pin 9 to one side of the switch. Run another wire to center of switch and PC board ground.



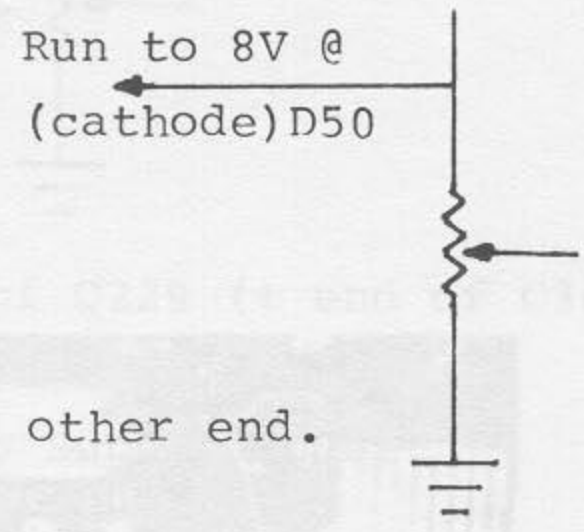
5. Adjust VCO Coil, L14. Without slide, you will get frequencies 27.420-27.860. Install slide to get 5's.

Clarifier Modifications-

1. Lift anode of D30, and connect Super Slide in series.

This gives 5Kc of Slide.

For 13Kc slide, change D30 to our Super Clarifier Diode.



2. Connect control to 8V source. Ground other end.

3. Clip D32.

-Reference; Volume 10 pp. 41-42.

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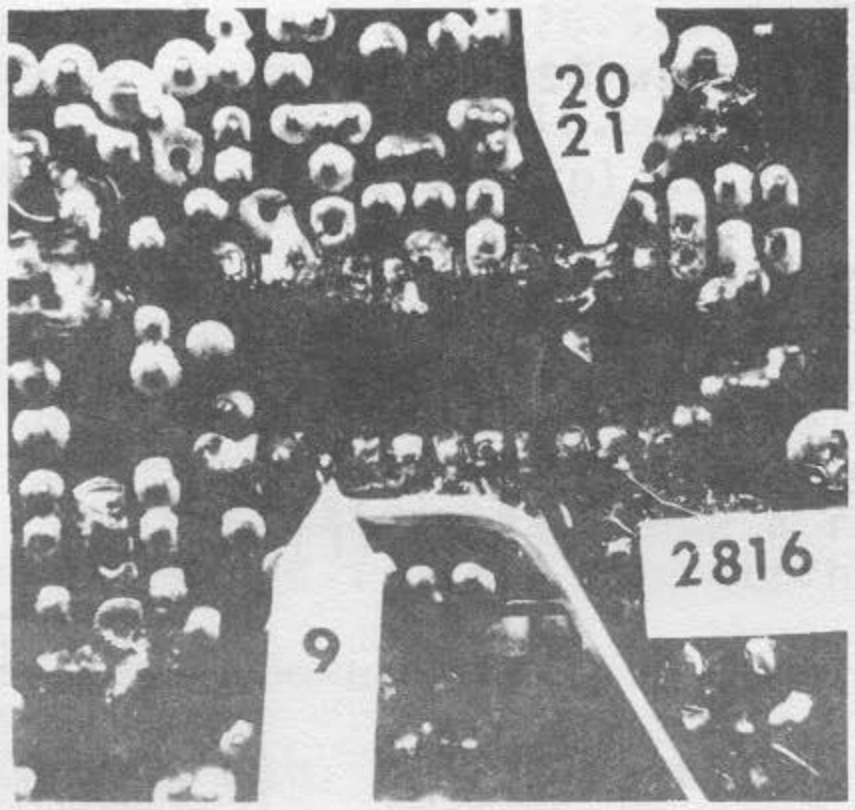
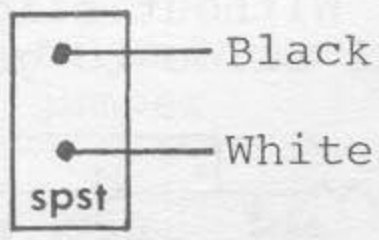
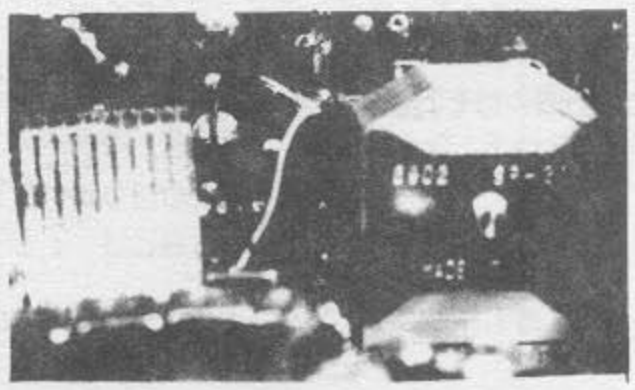
President AR144/Cobra 146GTL cont'd:

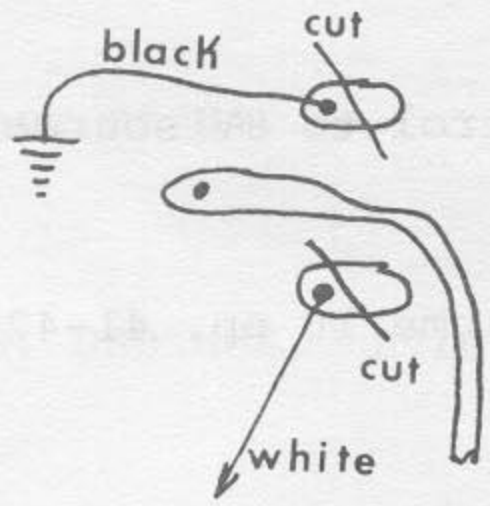
Picture below shows location of pins 9, 20, and 21





Picture below shows how to modify PC board on front panel to make clarifier work on transmit as well.





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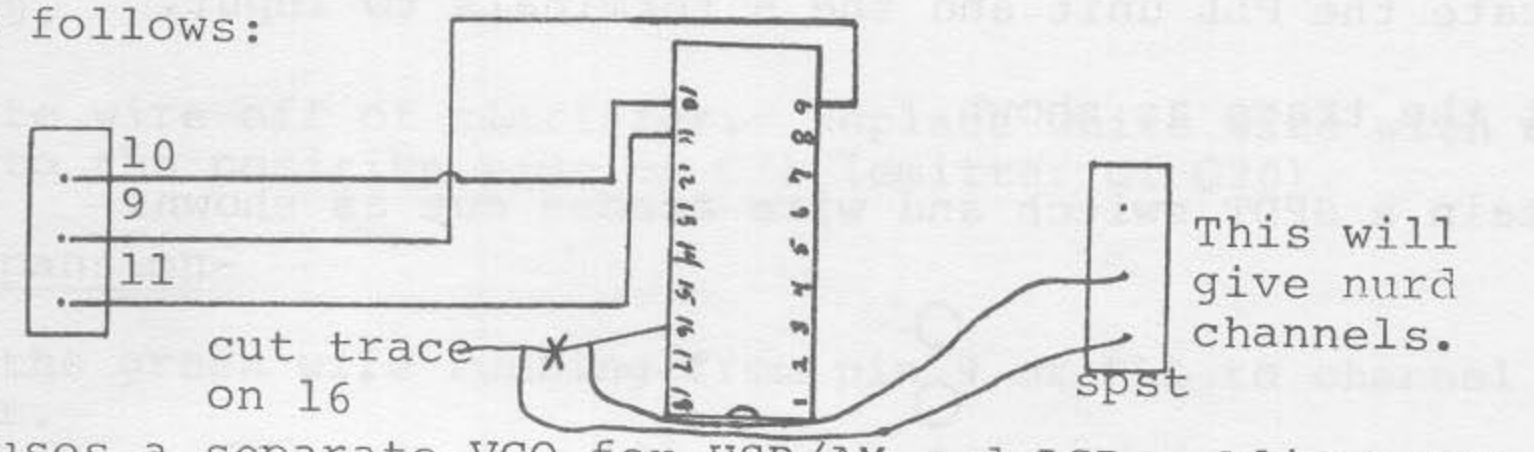
REALISTIC TRC 448 REC86345 PLL

1. Obtain a SPDT center off switch.

2. Wire as follows:

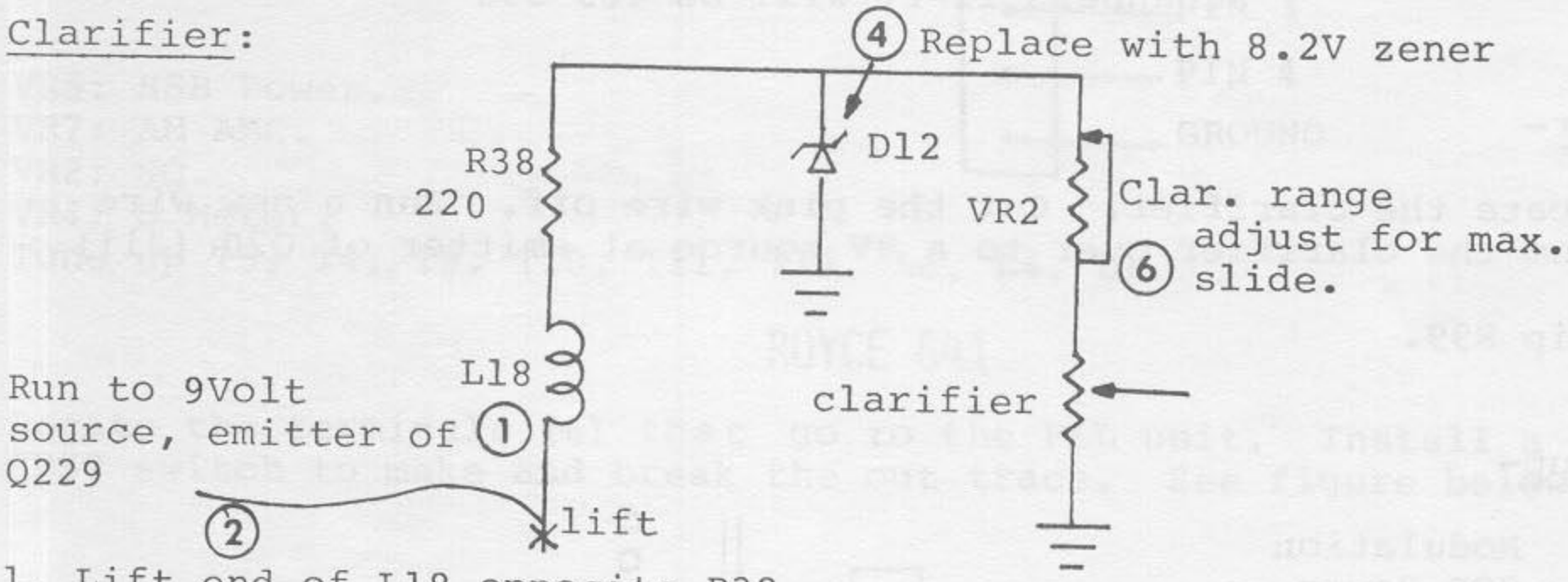


This unit uses a separate VCO for USB/AM and LSB. Adjust TC3 on USB/AM and TC2 on LSB.

VR4 SSB Modulation
VR5 AMC
VR204 SSB ALC
VR210 AM Power

Adjust T201, T202, T203, T204, T205, T206, L207, L208, for maximum RF output and frequency range.

Clarifier:



1. Lift end of L18 opposite R38.
2. Solder wire from this end to emitter of Q229 (+ end of C368).
3. Lift D15.
4. Replace D12 with 8.2Volt zener diode.
5. For more slide, change D11, and D17 to Super Diodes.
6. Adjust VR2, for maximum slide.

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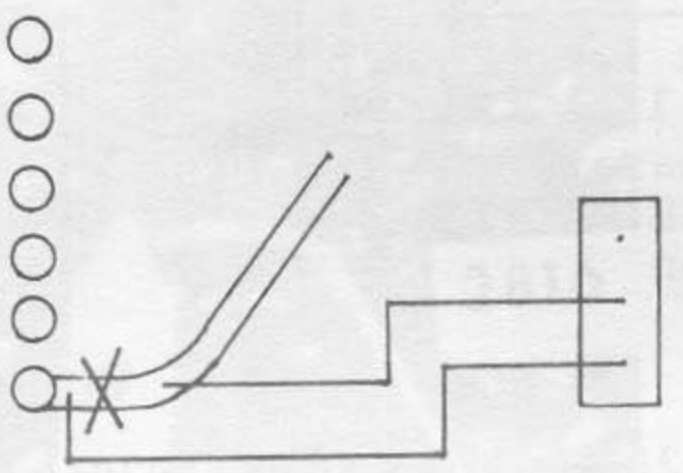
Frequency Modification-

1. Locate the PLL unit and the 6 terminals to input.

2. Cut the trace as shown.

3. Obtain a SPDT switch and wire across cut as shown.



Channels 11-27 will be 405-595

Slider-

1. Locate the clarifier. Cut the pink wire off. Run a new wire from the clarifier over to a 9V source at emitter of Q20 (J11).

2. Clip R99.

Tune up-

VR7	Modulation
VR8	SSB Power
VR9	Voltage Regulator
VR4	S Meter
VR2	Squelch Range

Adjust T12, T13, T14, T15, L6, L1, for maximum.

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ROYCE 1-632 UPDATE

Clarifier-

1. Clip R48.

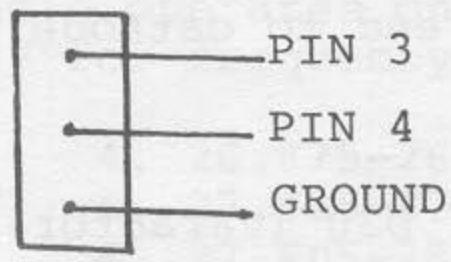
2. Cut White wire off of clarifier. Replace white wire with a jumper to the positive side of C71 (emitter of Q20).

Channel Expansion-

1. Locate the green wire running from pin 9 of PLL to channel selector.

2. Cut this wire in two and install an SPDT switch so you can make and break this connection.

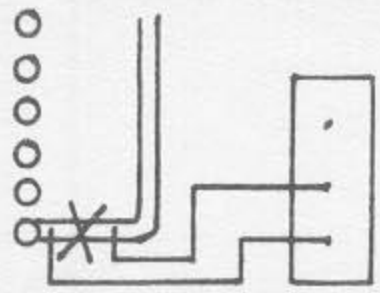
For nurd channels, cut trace from pin 4, to the channel selector. Bridge the cut with a 4.7K Ohm resistor. Connect a SPDT Center off switch as follows:



VR5; SSB Power.
VR7; AM AMC.
VR2; SQ.
VR4; S Meter.
Tune up T5, T4, T9, T10, T11, T12, L6, L4, L1.

ROYCE 641

Locate the terminals (6) that go to the PLL unit. Install a SPST switch to make and break the cut trace. See figure below.



SEARS 663-381050

VR6; SSB Power.
VR5; AM Modulation.
VR10; AM Power.
Tune Up L38, L37, L39, L40, L27.

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SEARS 663.3810 WITH 2824 CHIP

Clarifier-

1. Remove front panel. Follow these steps:

   A. Remove Knobs.
   B. Remove nuts on Volume and mode switches.
   C. Remove top and bottom case covers.
   D. Remove the 4 screws, two on each side of panel.
   E. Unsolder meter tabs on panel PC board.
   F. Lift out panel.

2. Locate VR403. Remove JP412.

3. Remove R405. Install solid wire jumper in its place.

4. Prepare a 6" length of wire. Solder one end to the hole where JP412 was next to Fine Tune control.

5. Solder other end to cathode of D50.

6. Clip D32.

7. Lift anode of D30 (varactor), and install a Super Slider in series. For more slide, use our Super Clarifier Diode and Super Slider.

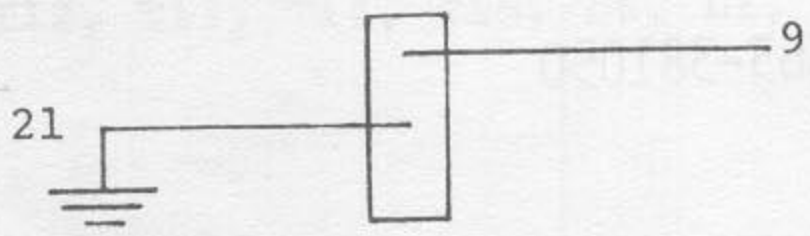
8. Reinstall front panel.

Frequency Expansion-

1. Unsolder and remove IC2. Replace with a UPD2816C. Be carefull--CMOS!

2. Ground pin 20 to pin 21.

3. Install switch as follows:



Adjust VCO L14.

Tune Up-

Peak L40, L39, L38, L37, L27 on USB.

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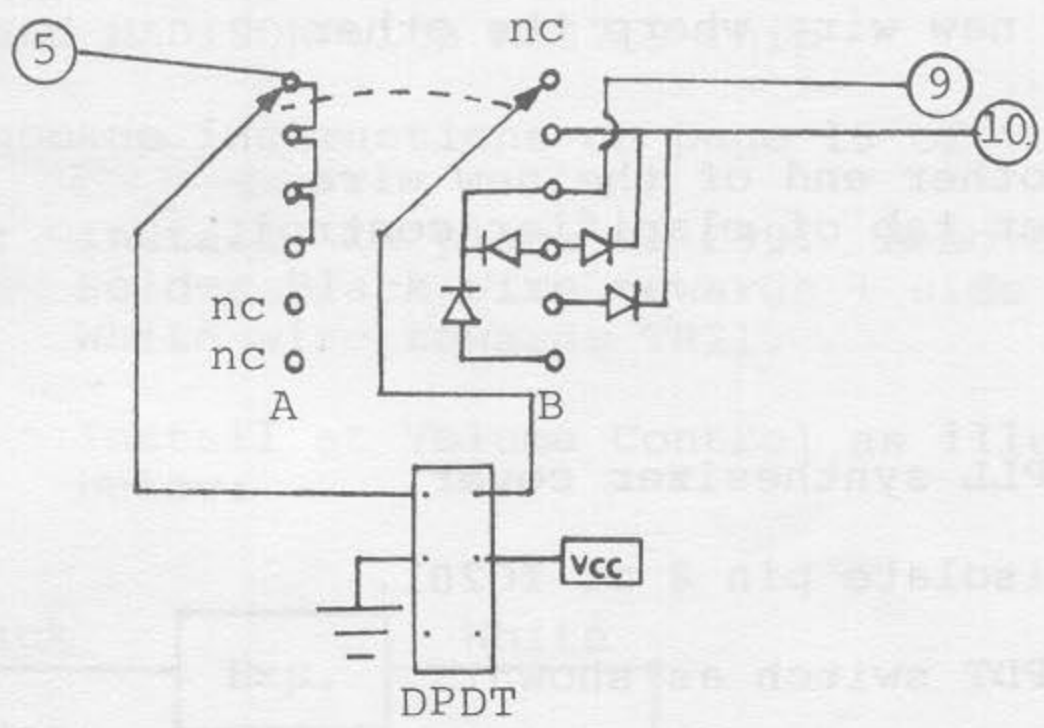
SEARS RT UPDATE 934-38260700

2Pole 6Position



With DPDT switch in off position, radio operates on normal 40 channels. Refer to Volume 6, Page 27 for frequency chart.

Position:
1. 26.325-26.545
2. 26.555-26.640
3. 26.645-26.865
4. 26.875-26.960
5. 27.425-27.595
6. 27.605-28.045

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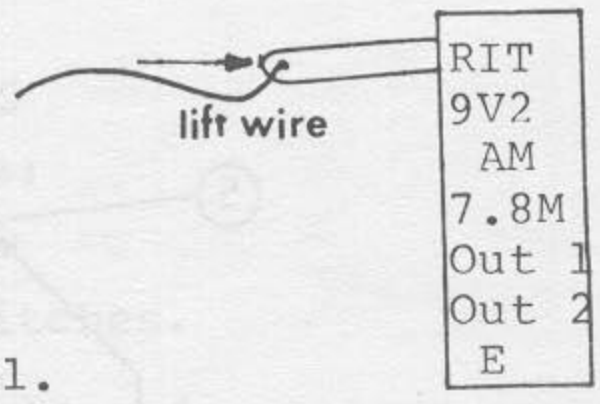
SHARP CB-5470 HD42851B3 CHIP

Clarifier-

1. Lift wire as shown at "RIT".



2. Solder in a new wire where the other was removed.

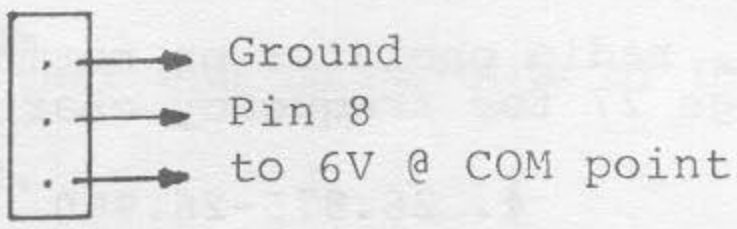
3. Solder the other end of the new wire to the center tab of clarifier control.

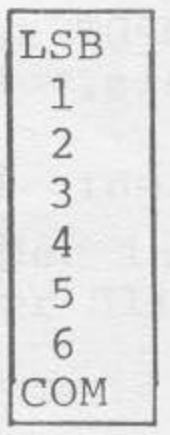
Channels-

1. Remove the PLL synthesizer cover.

2. Locate and isolate pin 8 of IC201.

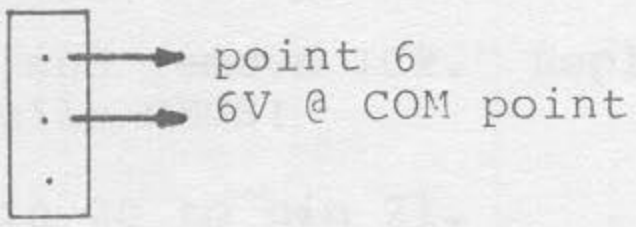
3. Wire up a SPDT switch as shown:





This will give channels 27.605-28.045.

For channels inbetween 405 and 605, wire up a SPDT switch as shown:



VCO coil - adjust T203 for full coverage. Stagger tune T204-T205 over full coverage with scope at TP204.

Transmitter Adjustments-

Adjust T305, T304, T303, T302, T301, L309, L306, L303, L302, L301 for maximum on USB, with a 1KHz tone. Do this 3 times. Adjust T205 for even power on all channels.

R339, SSB carrier null; C31, AM power; R541, AM modulation; R542, SSB ALC; R301, RF power meter.

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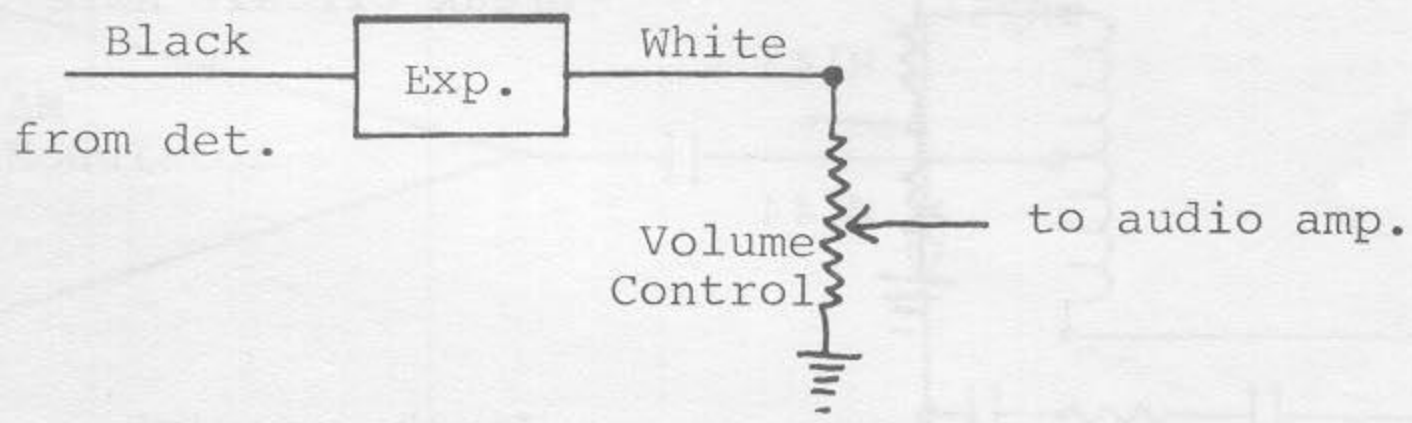
VSB-1 UPDATES

New GRANT and MADISON with MB8719 Chip

Disregard hookup instructions on page 15 of Volume 10.

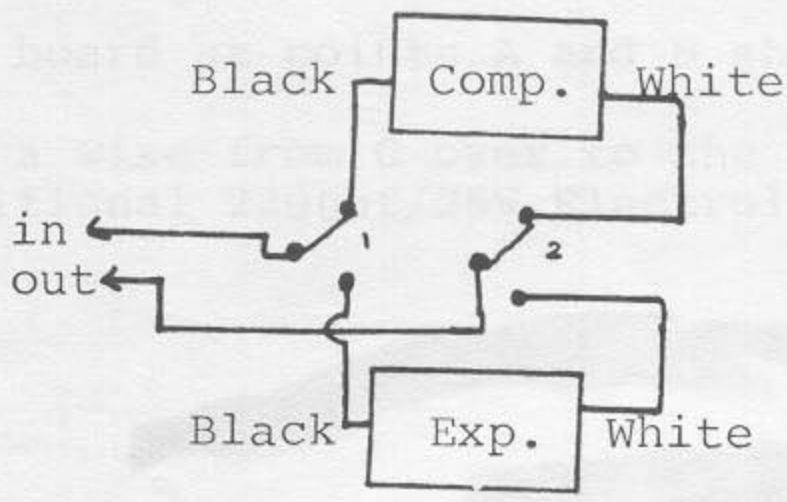
COMPRESSOR: Install in place of C99. Remove TR24. Solder Black wire towards + side and White wire towards TR21.

EXPANDOR: Install at Volume Control as illustrated below:

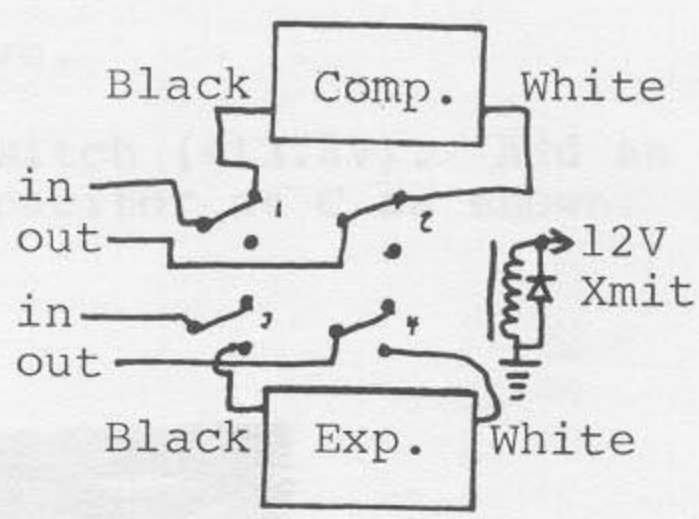


If the modulation and receive audio feed in at the same place or close together, it may be necessary to use a relay in order to prevent feedback. If this is necessary, we recommend the following procedural hook-up.

Same hook-in point



Different hook-in points



*Relay is 4PDT Radio Shack #275-214 12VDC @ 75ma. or equiv.

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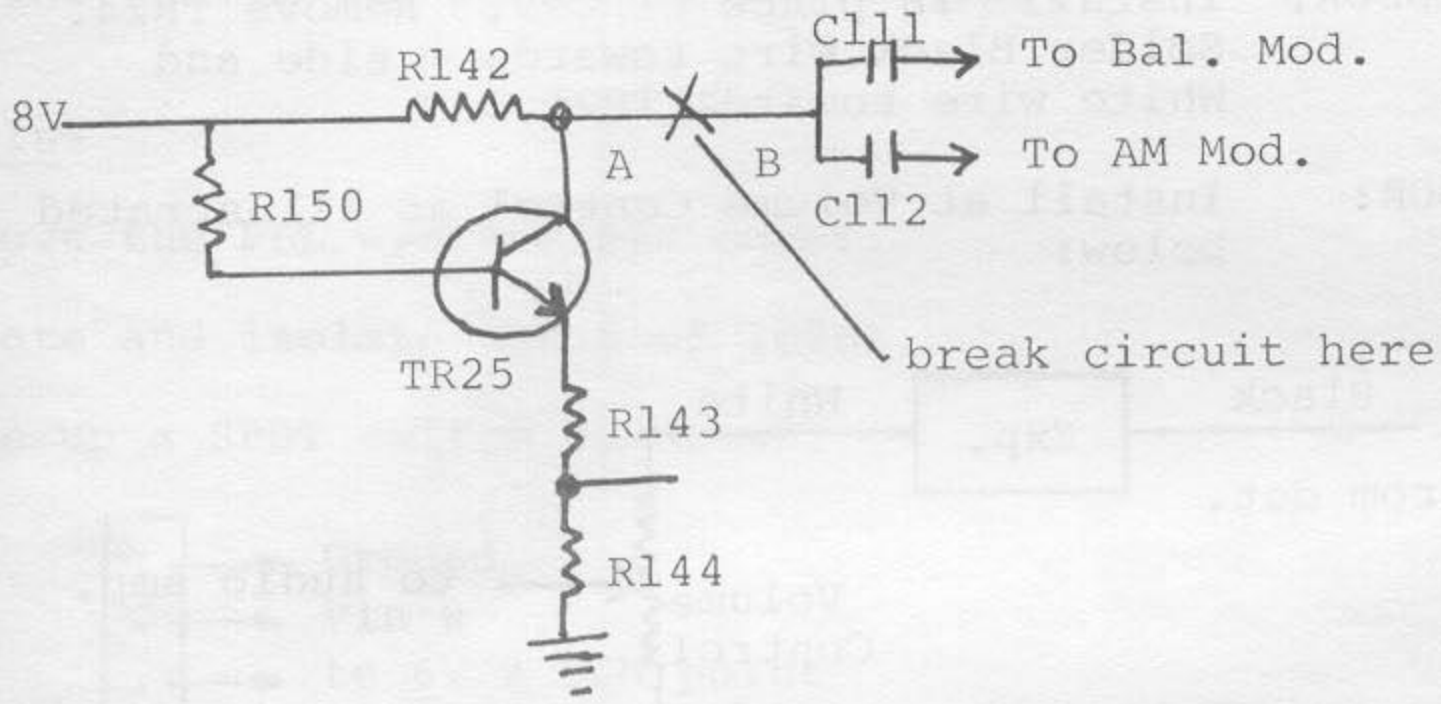
NEW VSB-1 HOOK UP INSTRUCTIONS

PRESIDENT AR144, COBRA 146GTL, & SEARS 663.3810

COMPRESSOR: Modify as shown:



Solder BLACK wire to point A above.

Solder WHITE wire to point B above.

CUT collector (middle lead) of TR27.

EXPANDER: Remove C139. Solder BLACK wire towards collector of TR36 and WHITE wire towards R181/C138.

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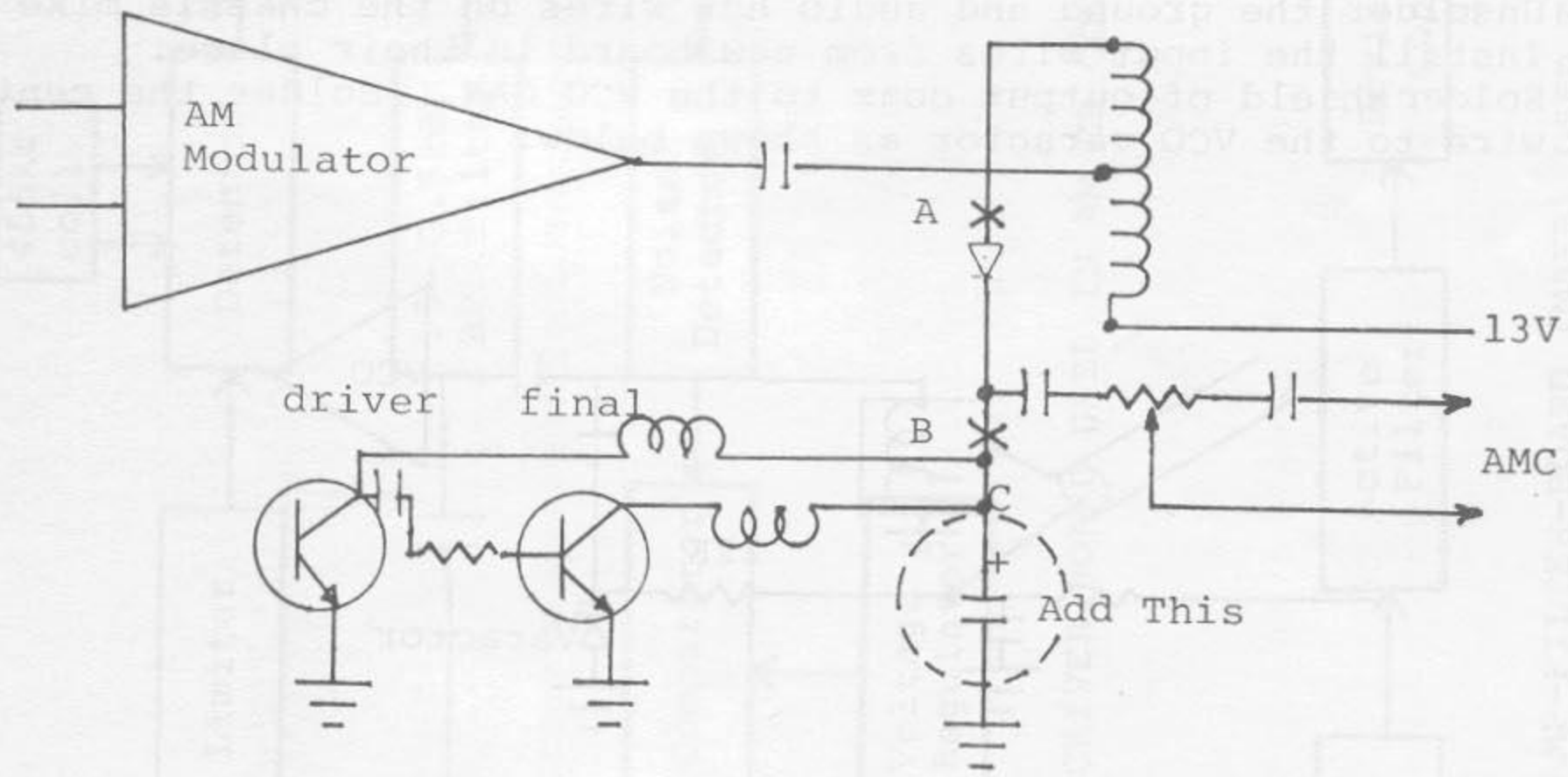
NEW FRONTIER: FM CB

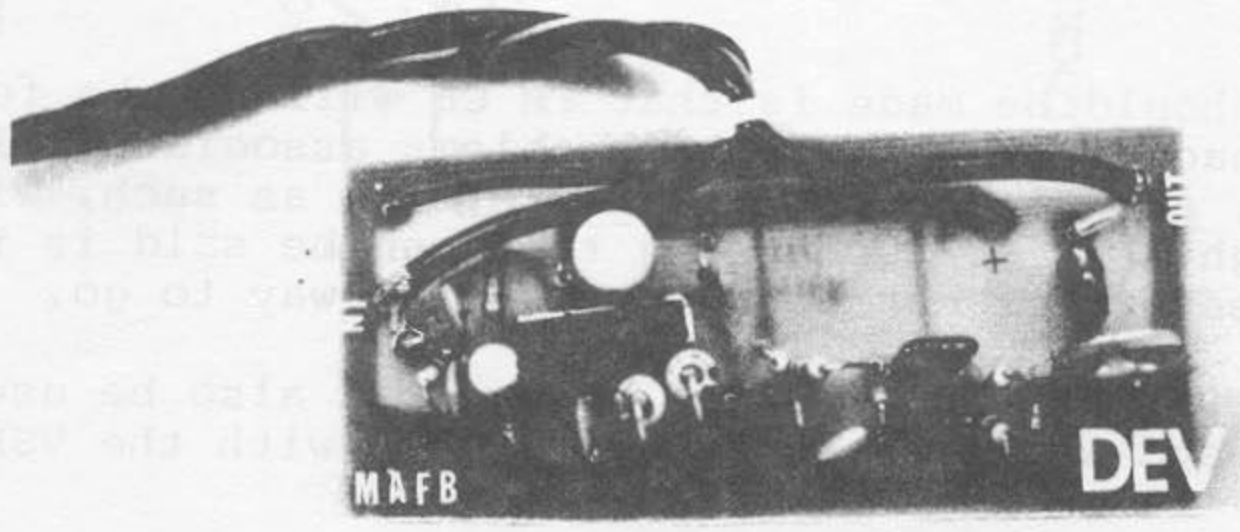
France and England have adopted 27MHz CB with one difference. Instead of the conventional amplitude-modulated carrier, they are using frequency modulation due to less RF interference problems. A standard PLL CB AM radio can be converted to FM easily.

We have designed an IC mike amp. with active filter which connects to the VCO varactor. The voice signal changes the VCO frequency at an audio rate, hence FM. The AM modulator is disabled as shown below:



1. Cut board at points A and B shown above.

2. Run a wire from C over to the power switch (+13.8V). Add an additional 2200uf/25V Electrolytic capacitor at C as shown.



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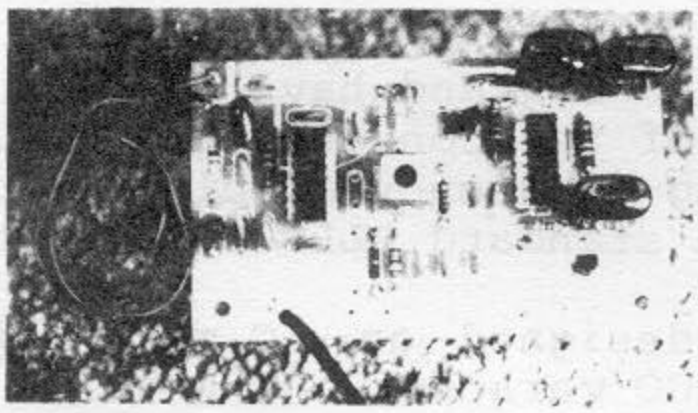
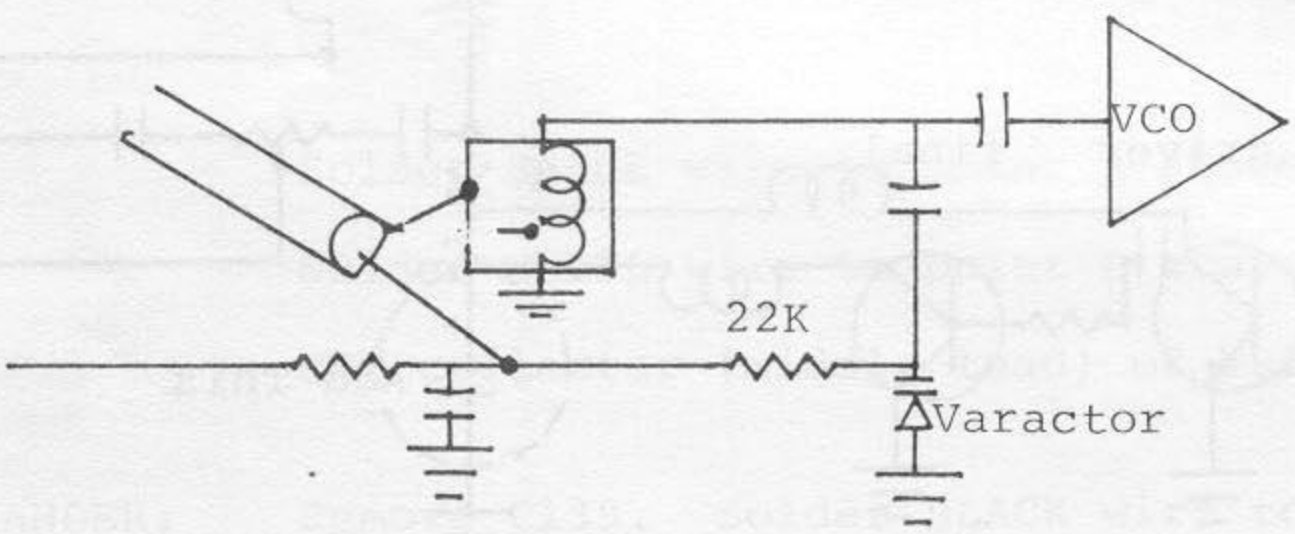
NEW FRONTIER: FM CB (CONT)

Installation of Deviation Board



1. Connect RED wire to 9Volt Xmit source.
2. Connect BLACK wire to a good ground.
3. Unsolder the ground and audio hot wires on the chassis mike con.
4. Install the input wires from new board in their place.
5. Solder shield of output coax to the VCO CAN. Solder the center wire to the VCO varactor as shown below.



We also have available a high quality FM IF strip for the receiver, which uses the 455KHz IF signal as the input. Also has outputs for noise activated squelch. The heart of the system is the LM3065 FM IF system.

Complete general hook-up instructions are included with the "FM EXPERIMENTER KIT" (#118), which includes the "MIKE AMP/FILTER DEVIATION" board (#118A) and"FM RECEIVER CONVERTER" board (#118B).

One point that should be made is that FM CB will not be found to be the ultimate panacea for all of the problems associated with regular CB transmission, and reception. FM is FM, and as such, will operate on a line of sight basis. One thing that can be said is that when used with a repeater, it can be a very useful way to go.

NOTE: The "MIKE AMP/FILTER"(#118A), board can also be used as a mike amp on AM, and works super in conjuction with the VSB-1!

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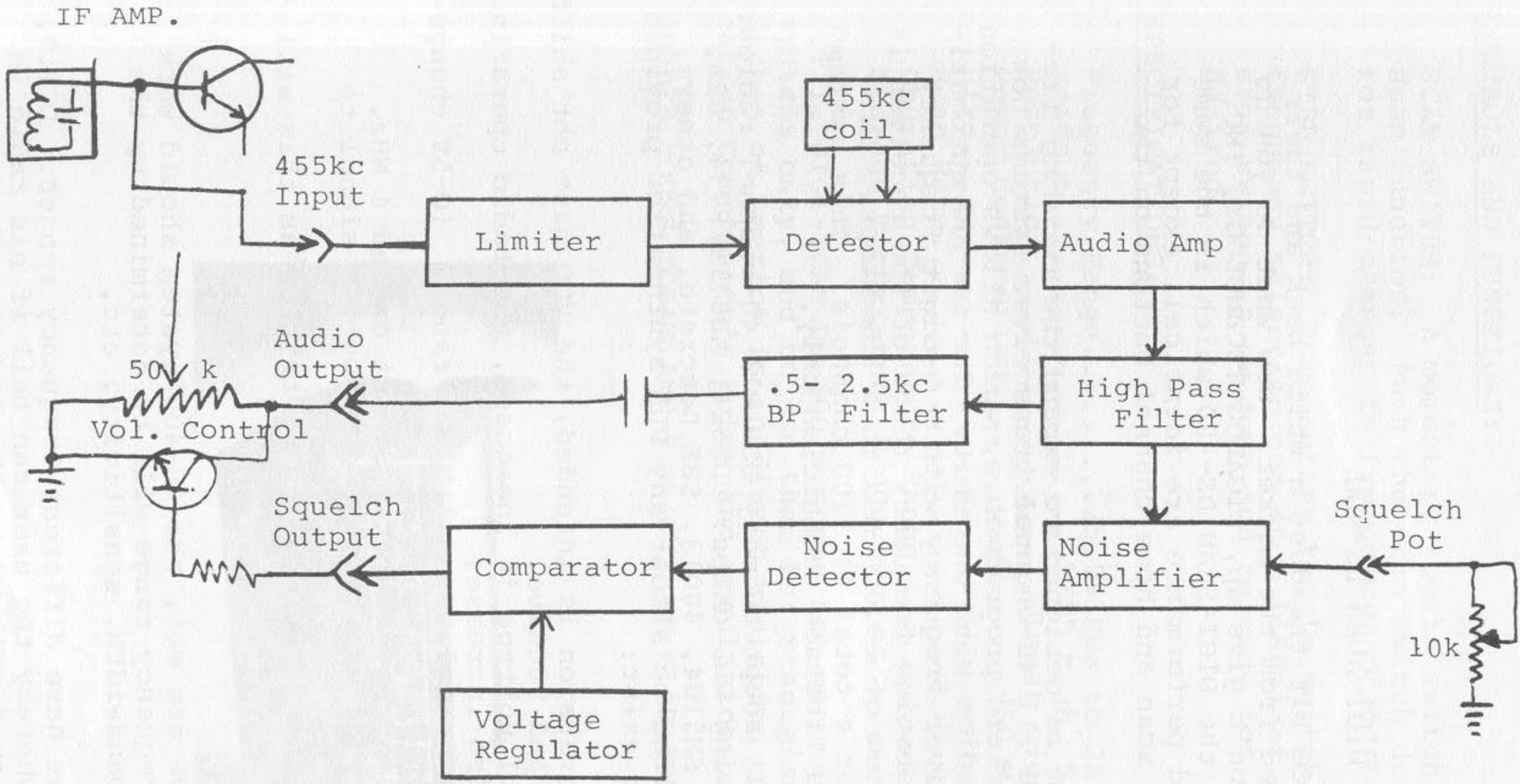
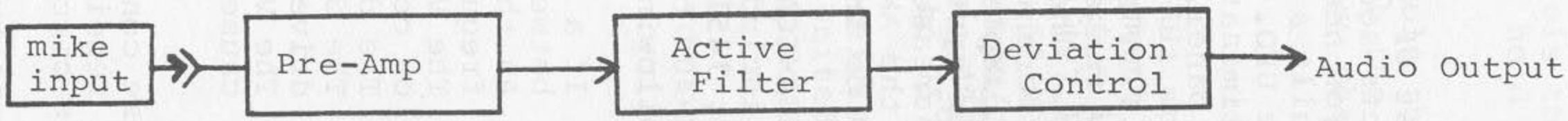


BLOCK DIAGRAM OF FM RECEIVER BOARD USED IN AM CB CONVERSION



BLOCK DIAGRAM OF MIKE-AMP-FILTER-BOARD (MAFB) USED TO MODULATE THE VCO RESULTING IN FREQUENCY MODULATION. ALSO CAN BE USED AS A PREAMP FOR THE VSB 1 Where Required.

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NEW PRODUCT

DIGI-SCAN DS-400

As most of you know REDCO bit the dust a while back and their products soon disappeared from the market. Now what do you do when you need a UFO? Don't give up, DIGALOG TECHNOLOGY, INC. has built a unit called the DIGI-SCAN DS-400 which is the same as the UFO. Hook up and performance are identical, except for the elimination of fast scan and home channel buttons on the front panel.

The D.T.I. DS-400 system is designed to expand the receiver frequency range of many SSB Pll 40-channel transceiver systems now in use. The DS-400 is field programmable, which allows operation on different types of radios with one unit. The DS-400 automatically displays the receiver frequency with a 5-digit frequency monitor system. The operating frequency range of the receiver is now increased to a maximum of 28.000 MHz in 5 KHz steps. This gives the AM-SSB operator a total of 1200 channels. This system should be installed by a licensed technician only.

The DIGI-SCAN DS-400 will adapt to many SSB Pll 40-channel radios. These include the following PLL chips: D2824, MB8719/8734, 02A, UPD858, 145106, LC7120, SM5104, 40013, SBE Descrete, and others. The DS-400 can be installed to almost any PLL synthesizer provided the following conditions exist:

1. If a 10-meter conversion is intended, the VCO must not shift between transmit and receive.
2. As the VCO control voltage is increased, the radio operating frequency must also increase.
3. The VCO should have at least a 1.5 MHz range. (0-5V change on control voltage input to VCO).
4. The down mixer frequency output must not exceed 4 MHz.
5. The down mixer signal must have enough output signal to drive the DS-400.
6. The VCO output must NOT be doubled or tripled as this will cause 10 or 15 KHZ steps.

If these conditions above are met, the DS-400 system should work on the receiver. The frequency range will be determined by the various circuits; i.e. bandwidth, sensitivity, etc.

Different types of radios have different frequency ranges. D.T.I. has developed a system whereby the user can tell if his radio is operating on the frequency displayed by the DS-400. The system is called an "out of lock" indicator. If, for any reason, the radio should go out of lock the first digit on the DS-400 will become an "L" instead of a "2".

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DIGI-SCAN DS-400 cont'd.

CONTROLS AND FUNCTIONS:

SCAN SWITCH: A momentary toggle switch which controls the scan function. Push the scan switch down or up and hold for rapid changes in frequency. (10 steps/second)

STEP SWITCH: A momentary toggle switch which controls the frequency selection one step (5KHz) at a time. Push the step switch up or down and release for each frequency change desired.

SPECIFICATIONS:

Frequency Range.....25.995MHz to 28.000MHz in 5KHz steps
Readout.....1/2" high, 5 digit, 7 segment LED
Resolution.....Least significant digit = 1KHz
Power Consumption.....450 Ma at 13.8VDC (27.155)
Size.....1½" x 5" x 5½"
Scan Rate.....10 steps/sec.
Operating Temperature Range.....10° to 40° C
Storage Temperature Range.....-40° to 75° C

D.T.I. DIGI-SCAN DS-400 systems are manufactured as receiving systems only, and to use them for transmission in the United States of America is in direct violation of the Federal Communication Commission's rules and regulations.

!ORDER YOURS TODAY AND YOU WILL BE GLAD TOMORROW THAT YOU DID!

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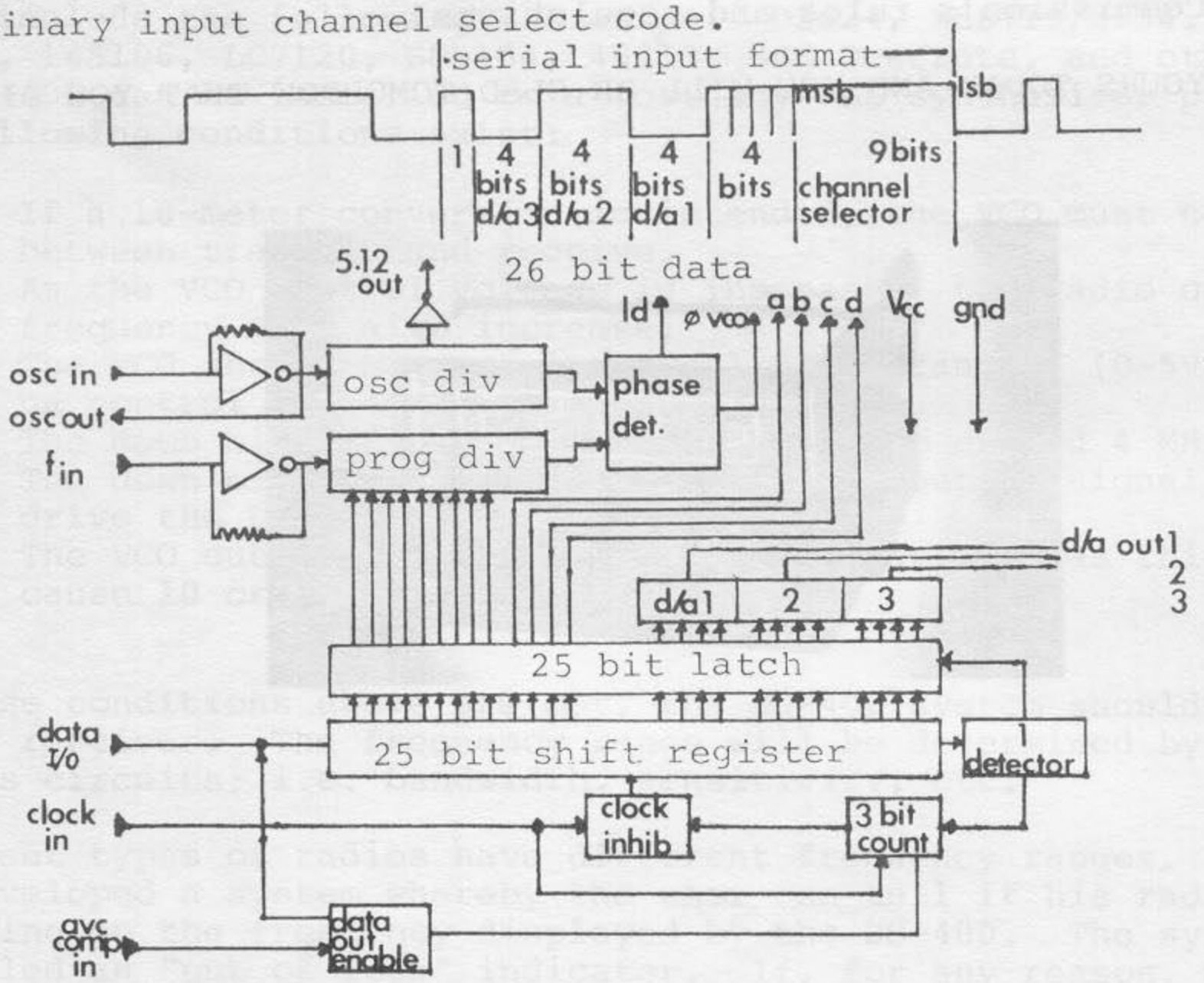
COMING ATTRACTIONS

SERIAL DATA/PLL FREQUENCY SYNTHESIZERS

These are already in use in programmable scanners and will probably be seen in CB transceivers in the not too distant future. Probably on the drawing boards right now, as the manufacturers are hassled by you know who about you know what. Anyway, the serial data designs could prove to be very interesting indeed. It is something new, but don't worry - we will guide you through them just as we have through conventional PLL's. Now to the technical stuff.

An example of a currently available serial data chip is the MM55122 manufactured by National Semiconductor. It is CMOS, operates from a single power supply, and features an on-chip oscillator, a 2^{10} divider chain, phase detectors and binary input programmable divide. So far, not much difference. However, channel selection is accomplished by a 9-bit serial code included in a 26-bit data string inputed to the data I/O pin. The 26-bit data consists of the following.

Logical 1 sync bit
Three 4-bit data to generate analog outputs for such things as
squelch, AVC, Volume, etc.
4 control bits that are latched and externally available at pins A-D.
9-bit binary input channel select code.



More on these devices as they appear on the market!

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UNCONVERTABLE AT THIS TIME

G.E. 3-5900A TC9109P

Alignment:

Peak T2, T3, T4, L6. Adjust RV3 for best modulation.

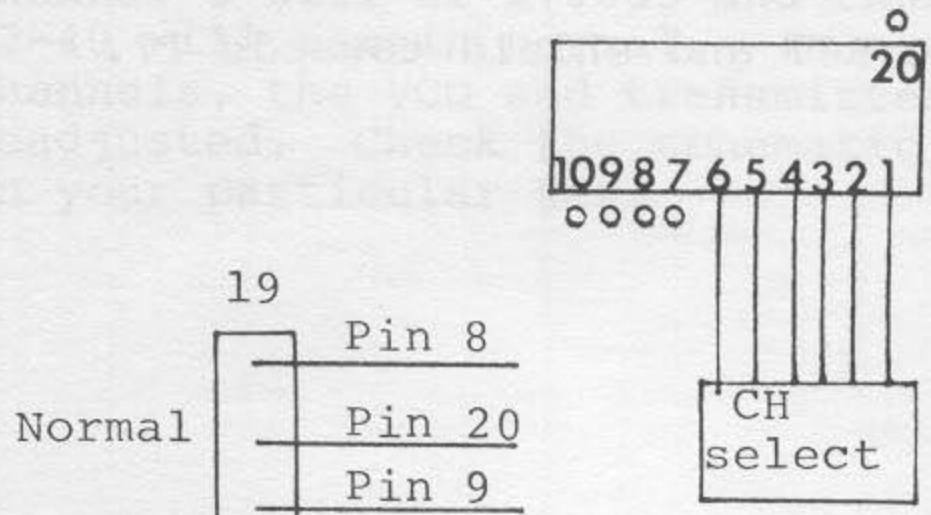
Note: The 9106/9109 series AM units are terrific 40 channel units, but forget trying to get 26.545 for the truckers (or any other out of band frequency for that matter!). You cannot change the 10.240 reference Xtal or you will get a split on REC/XMIT. Remember, 10.240 ÷ 1024 = 10KC reference. You can't jump the chip- it has a Read Only Memory. You can't use pin 8 because only your Xmit would go low, RX would stay on 1-40 channels. This chip does not use a 15.360MHz down mixer input to the programmable divider input. The programmable divider input is the VCO output with out any additional down-mixing. I'm not saying that the PLL could'nt be modified by changing the chip and adding a down-mixer and new channel selector. It just would'nt be cost efficient.

There are still quite a number of HYGAIN 02A Cybernet boards available for around $10. It would be smarter to buy a board and add the rest of the goodies, than try to convert the above chip.

COLT 210 LC7130 PLL

ADD CHANNEL 9 AND 19 AT

THE FLIP OF A SWITCH



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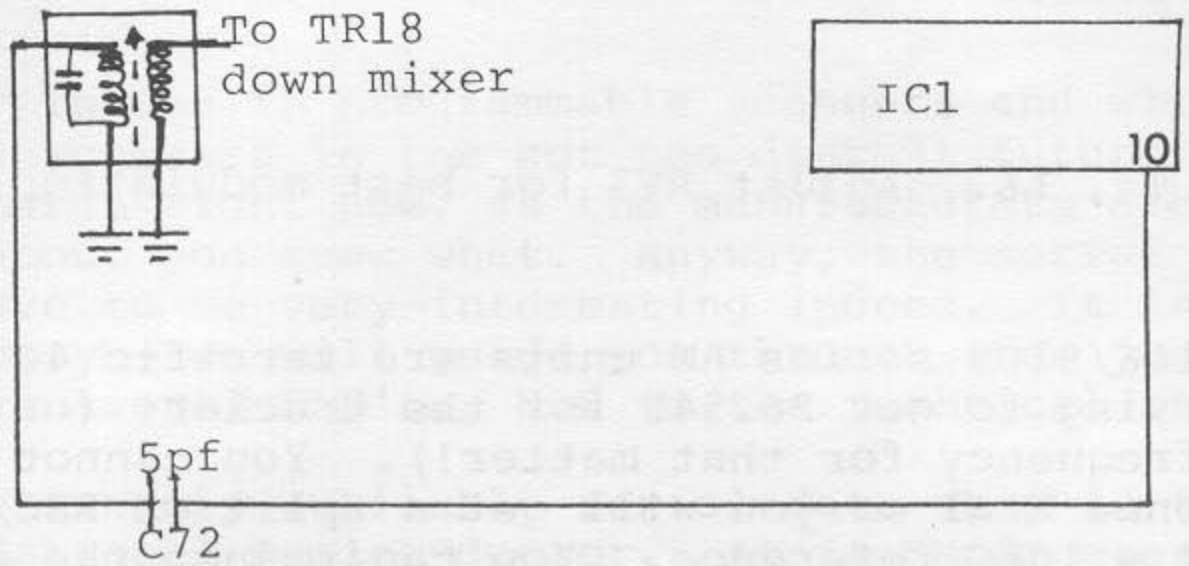
ZAPPER 9000 INSTALLATION UPDATE

CRAIG L150 (UPD2814C)



1. Remove C72.

2. Solder the center lead towards the coil.

3. Solder the shield wire towards pin 10 IC1.

4. Adjust L8 for best overall performance.

5. Adjust L10 VCO.

Alignment-

Peak L12, L13, L14, L15, L17 for frequency coverage desired.
Adjust VR2 for maximum modulation or clip D4.

REALISTIC TRC420A

1. Remove C63.

2. Solder center lead towards R67 and shield towards T7.

3. Adjust T8, VCO coil.

Alignment-

Adjust T10, T11, L5, L4, L3.

Modulation-

Cut collector of Q14.

PLL hint- Clip D11 and play with input code on pins 1-6 of IC1.

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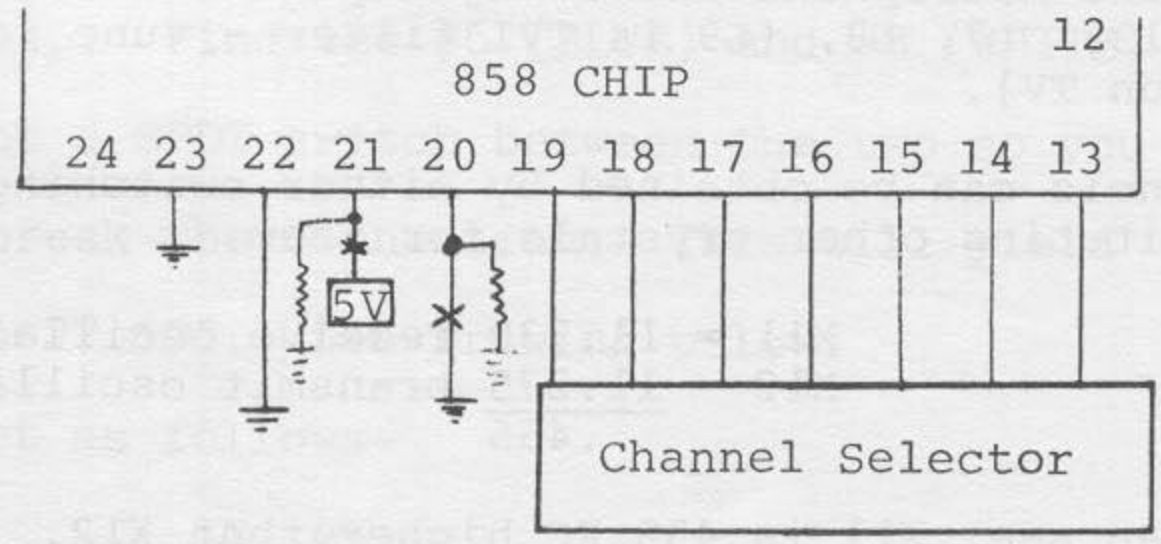
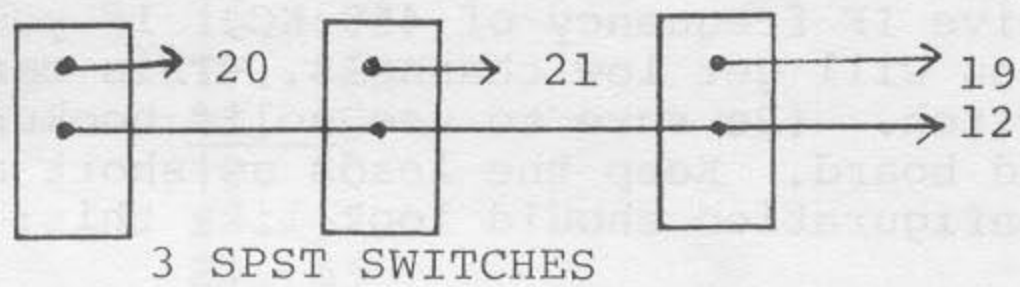
uPD 858 PLL AM CONVERSION INSTRUCTIONS

Somehow the AM frequency modification for the uPD 858 PLL Chip never did get into print, so here it is.





3 SPST SWITCHES

1. Isolate pin 20 from ground by cutting the pc trace.
2. Solder a 4.7k resistor from pin 20 to ground.
3. Cut trace on pin 21 and add a 4.7k resistor to ground.
4. Wire up switches and connect to pins 12, 19, 20 and 21 as diagramed above.

Taking pin 21 low will drop frequencies by 1 MC. With pins 19, 20, & 21 High, channel 1 will be 27.365 and channel 26 will be 27.665. 27-40 remain normal. With pin 20 and 21 high, 19 low, channel 27 becomes 27. 675 and channel 40 is 27.805.
If you take pin 20 high, channel 1 will be 27.765, channel 8 will be 27.855 and channel 25 will be 27.845. 27-40 will remain normal. In order to get the extra channels, the VCO and transmitter will have to be readjusted. Check the schematic for the coil numbers on your particular set.

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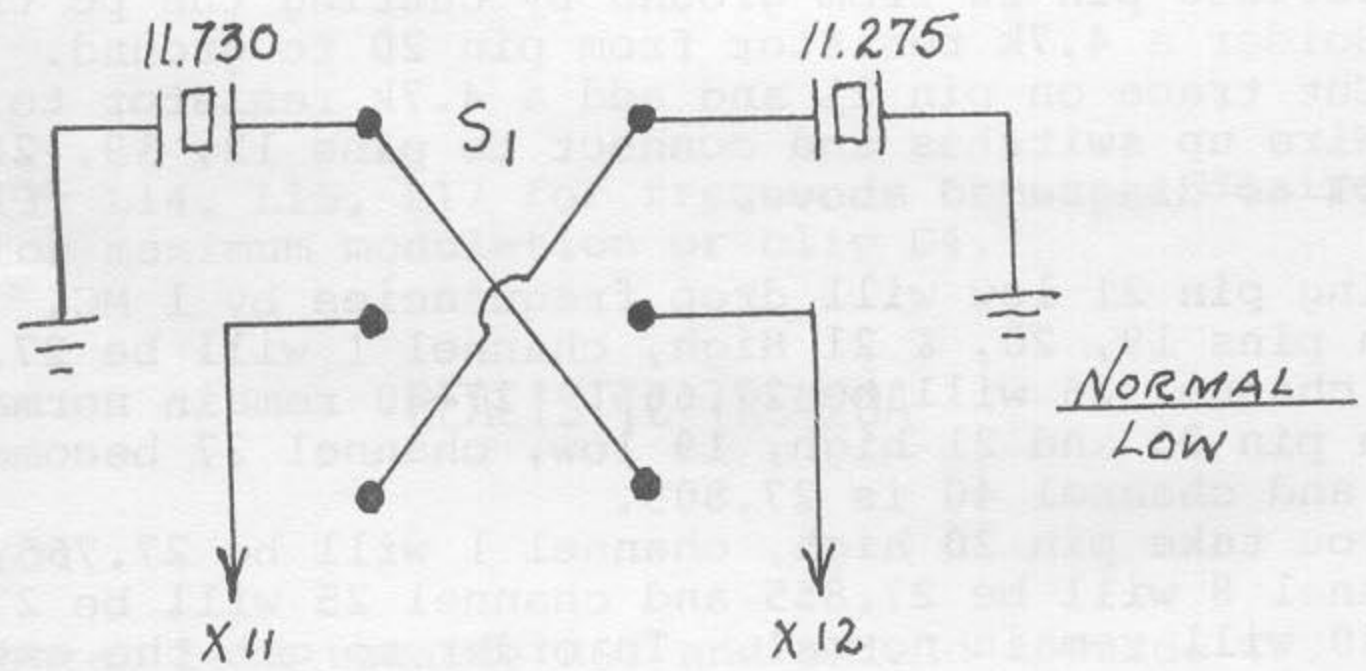
Modulation adjustment: RV2

Tune the following coils for maximum with a 1000 Hz tone injected through the microphone and using a peak reading wattmeter on channel 13: L7, L8, (L9 is TVI filter - tune for minimum interference on TV).

New channels can be obtained by either switching X11 and X12 or by substituting other crystals for them.

X11 = 11.730 receive oscillator
X12 - 11.275 transmit oscillator
.455

As you can see, X11 is 455 KC higher than X12. This is how you get your receive IF frequency of 455 KC. If you swap X11 and X12 around, you will get low channels. This can be done easily by using a switch. (Be sure to use solid hookup wire between the switch and board. Keep the leads as short as possible.) The wiring configuration should look like this:



S_1 = DPDT toggle switch

NOTE: If you use other crystals, they must be 455 KC apart so receive and transmit will work together correctly.

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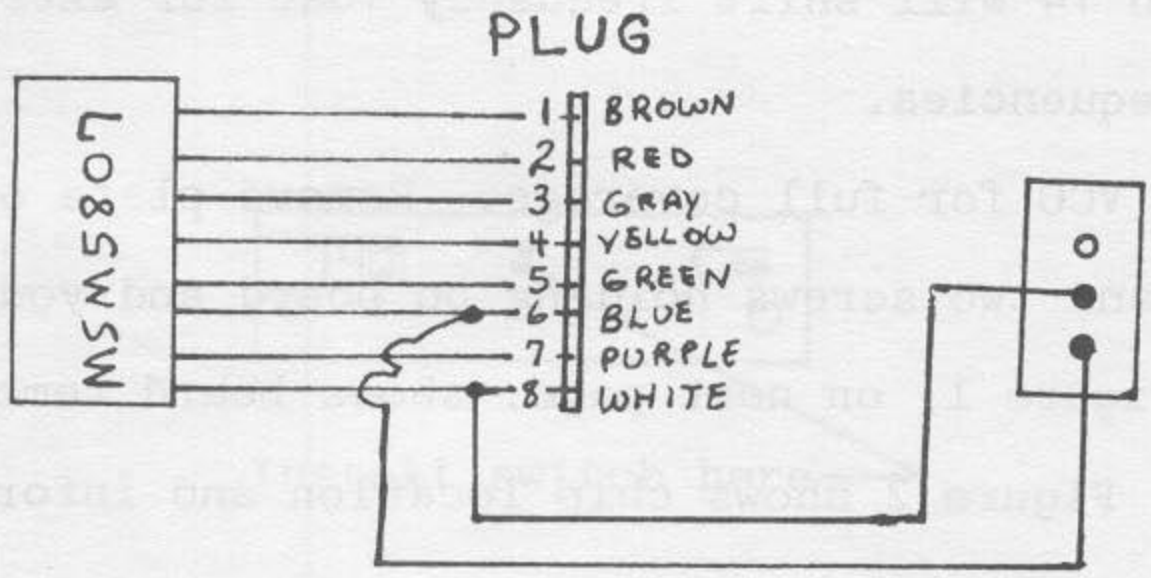
FIELDMASTER MICRO-MINI 40 Frequency Expansion Details

Locate the plug from channel selector over to the MSM5807 PLL chip. Find the #6 (BLUE) and #8 (WHITE) wires. Connect a SPDT switch between the two so you can make and break the connection. This will yield channels up to 27.595. See Drawing below:

Frequency Chart as follows-

1. 28	15. 45
2. 29	16. 47
3. 30	17. 48
4. 32	18. 49
5. 33	19. 50
6. 34	20. 52
7. 35	21. 53
8. 37	22. 54
9. 38	23. 57
10. 39	24. 55
11. 40	25. 56
12. 42	26. 58
13. 43	27. 59
14. 44	28. NORMAL - 40



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DELCO FACTORY AM/FM/CB COMBO UNIT

CBD-40, CBD-20, CBD-20A Models

The model 40 has the am,fm,cb all in one package. This model will be described in detail here. If you have the model 20 or 20A, you will find a separate cb module with an 02A chip and looks very much like a Kraco 4020. Now let's get down to business.

1. Remove the unit from the dash.
2. Remove the top of the radio. You are now looking at the underside of the pc board. The board is labeled so you will be able to find and adjust everything directly from underneath.
3. Locate the IC labeled IC SYNC. Find pin 9. Cut this pin loose from its 5v source and you have dropped 640kc. Your range is now 26.325 thru 26. 765.
4. By applying 5v to pin 10 you will go as high as 27. 595.
5. Pin 14 will shift frequency 10kc for extra inner frequencies.

Adjust VCO for full coverage. Remove plate on rear of radio and two screws holding pc board and you can remove it. Figure 1, on next page, shows board removed and turned over. Figure 2 shows chip location and information.

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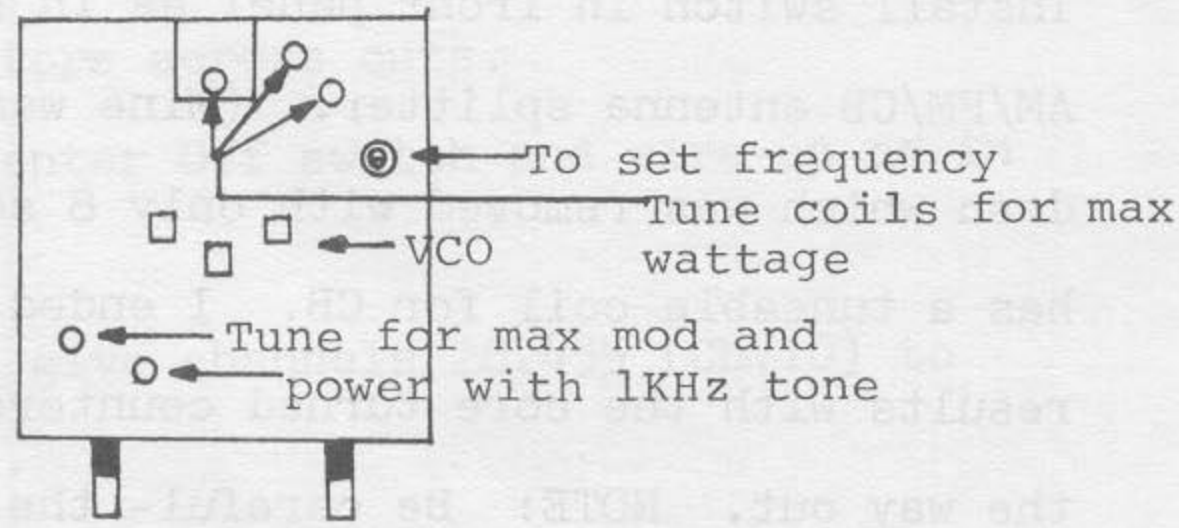
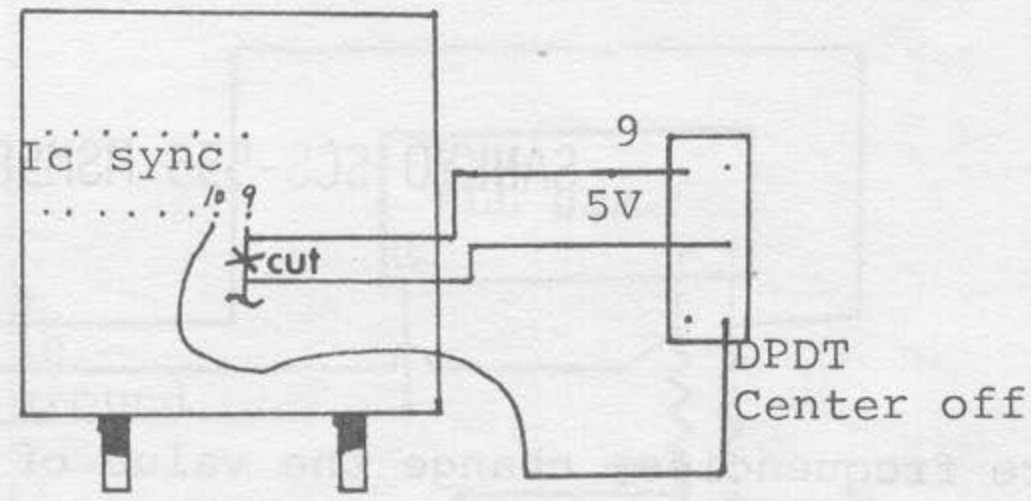
DELCO CBD-40

Fig. 1



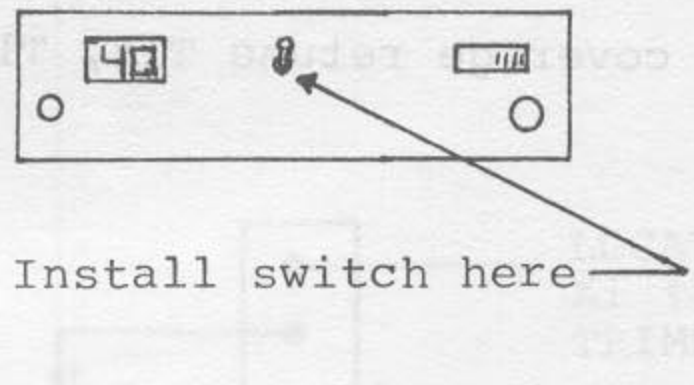
FRONT

Fig. 2



FRONT

Fig. 3



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Wire up the DPDT Center-off switch as diagramed in Fig. 2. Install switch in front panel as in Fig. 3. Now locate the AM/FM/CB antenna splitter. (Mine was located under top of dash which was removed with only 8 screws!) The splitter has a tuneable coil for CB. I ended up getting maximum results with the core turned counterclockwise, almost all the way out. NOTE: Be careful- the coil core will screw all the way out. Works Great!

SANKYO SCS-555 MSM5807

For more frequencies, change the value of X2 and switch with a switch.

Replace D21 with a Super Clarifier Diode for more VCO range.

T17 is VCO coil.

Modulation-

Adjust R62 or remove Q11.

Peak out T11, T12, T13, T1.

For wider frequency coverage retune T18, T19, T20, T14, T15, T16.

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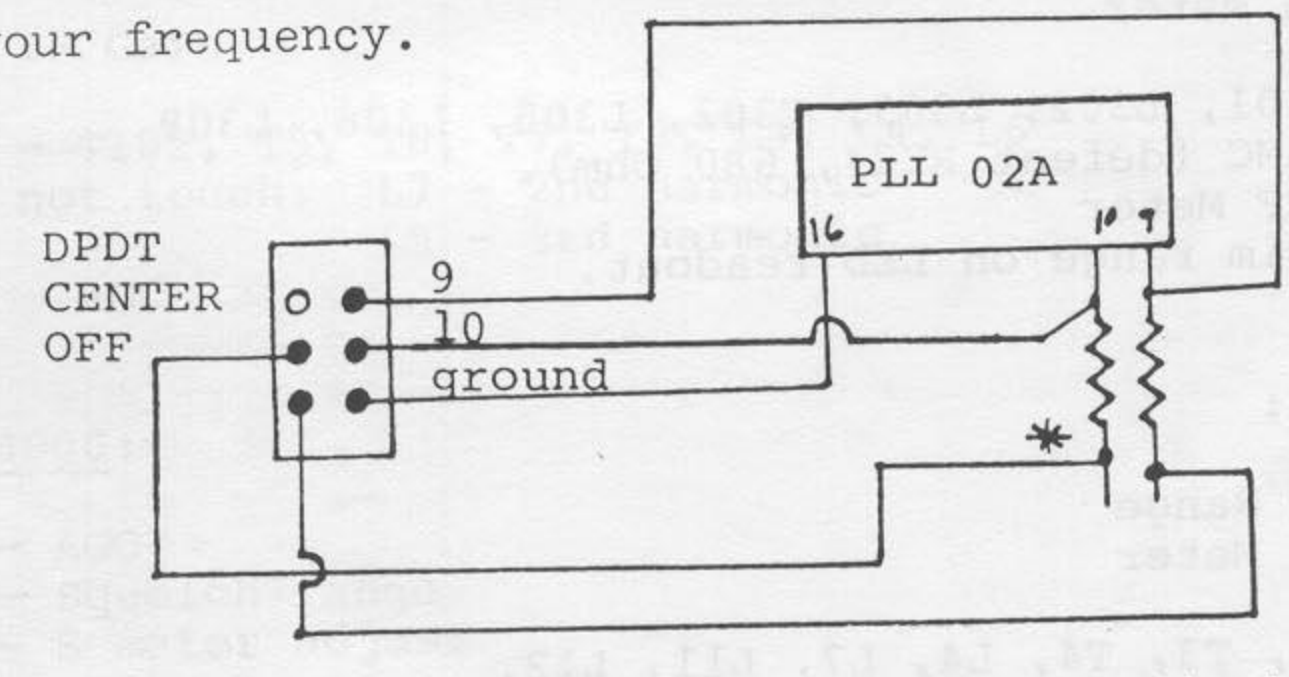
BOMAN CB 910 Update Pll 02A AM Chassis

1. Cut board circuit traces at pins 9 & 10.
2. Add 3k ¼W resistors across cuts.
3. Obtain a DPDT Center Off switch and wire up as in diagram below.

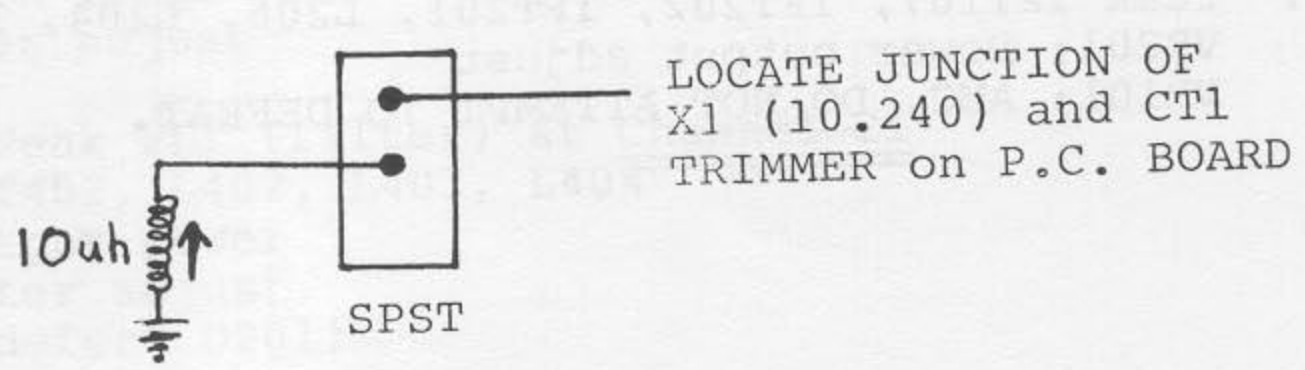
   Position 1 will give channels 26.435 (Ch.10) to 26.745 (Ch. 38).

Position 2 (Center) will be Normal channels.

Position 3 will render channels 26.755 (Ch. 10) to 27.065 (Ch. 38). Use Frequency Counter to verify your frequency.



The following can be done if you would like to be able to switch over to even channels, such as 26.750. Add a 10micro-henry choke and adjust trimmer to adjust for on-frequency operation. Switch to 0's or 5's with a SPST switch.



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SPECIFIC RADIO TUNE-UPS

AUDIOVOX MCB-5000:

Change final to 2SC1306. You can push the original to +7 watts, but it won't take it for long.

RX: R247; SQ Range
R213; S Meter

TX: T201, L202, L204; peak
R268;AMC (defeat C273, 3.3mfd Electrolytic).
R212; RF Meter
Note: R241 may be pulled for improved NB (220K Ohm).

CRAIG L1001:

RX: R1117; SQ Range
R1128; S Meter

TX: Peak T301, L302, L303, T302, L305, L308, L309.
R226; AMC (defeat R224, 680 Ohm).
R319; RF Meter
R510; Dim range on LED readout.

G.E. 3-5819A:

RX: RV1; SQ Range
RV3; S. Meter

TX: Peak L5, T3, T4, L4, L7, L11, L12.
RV2; ALC (defeat C96).
RV4; RF Meter.
RV501; SWR Meter (calibrate against an external meter).
RV502; AWI (see Vol. 9, Page 31 "GE3-5821A" for alignment).

J.I.L. 615CB:

RX: VR202; SQ Range

TX: Peak IFT107, IFT202, IFT201, L206, L204, L203, L202, L201.
VR201; Power output adjust
VR101; AMC, DO NOT ATTEMPT TO DEFEAT.

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SPECIFIC RADIO TUNE-UPS (Cont'd):

JOHNSON MESSENGER 4170/4175 (Update):

RX: R17 - IF Gain
R42 - S Meter Adjust

TX: Peak - T15, T16, T17, T18, L5, L6, L7
Mod. Defeat - Pull Q19

Model 4175 - Pull R47; put 5K variable resistor in place; use to adjust lights on TX.
Model 4170 - Pull R47; put 15K variable resistor in its place; use as RF Meter adjust.
For extra frequencies: Pin 13 of PLL to 10.31 VDC, @ (Pin 6 of PLL).
Correct Factory P/N for P11: 3001-201 is: 544-3001-201

JOHNSON VIKING 4330 & 4360:

Change final to 2SC1306

RX: R2 - IF Gain

TX: Peak - T102, T5, T6, T7, T8, L3, L4, L6
NOTE: Do not touch: L7 - 2nd harmonic
L5 - 3rd harmonic
R227 - AMC

KRACO KCB4000:

RX: VR1 - AGC
VR7 - Squelch range
VR6 - S meter adjust

TX: Peak - L2, L3, L6, L9
VR4 - AMC (Do not defeat!)
VR5 - RF Meter adjust
NOTE: If you have trouble getting modulation up, tune L3 & L6 for maximum modulation.

KRACO KCB4005:

RX: VR103 - squelch range
VR102 - S meter adjust

TX: Important! Peak FL1 (filter) at Channel 21
Peak - T401, T402, L402, L403, L404
VR402 - RF output power
VR403 - RF meter adjust
VR201 - AMC (defeat D201)

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SPECIFIC RADIO TUNE-UPS (Cont'd):

LAFAYETTE DYNACOM 40 (WALKIE-TALKIE):

Unit has a PLL 02A chip - for extra channels (Pin 9 & 10)
Small switch will mount on top of case.

RX: Adjust for maximum audio - T10, T8, T7, L14, T6, L16, T5, go back and re-adjust T10, T8.
RV1 - Squelch range
RV3 - S Meter

TX: Heat sink Q4
Change insulator on Q5 to thin mica TO-220
Change stock antenna on unit to Radio Shack P/N A-0292, catalog no. 21-184, TRC-200
After changing the above:
NOTE: RF meter to ext. ant. jack.
Max. out - T3, T4, L7A, L11, L12
AMC - RV2 (defeat C96, 3.3uf
P-RF meter - RV4 (Adjust till just comes in the blue.
Disconnect meter to ext. ant. jack.
Extend antenna fully, using field strength meter - max. L17.
DO NOT TOUCH T13 - TVI!

LAFAYETTE SSB 140:

Change final to 2SC1307, original only 2 watt.
In AC power supply, change C1 (2,200uf/25volt), to a 3,300uf/35V.

RX: RV8, AGC
RV9; AM SQ Range
RV10; SSB SQ Range
RV6; AM S Meter
RV7; SSB S Meter

TX: Peak (USB) T4, T5, T6, L11, L7, L13.
RV4, RV5; Carrier balance
RV1A; Final Bias
RV11; SSB Mic Gain
RV2; SSB RF ALC
RV12: AM AMC. Do not defeat.
VR4; AM Power
RV3; RF Meter
RV501; SWR Meter Calibrate
RV521; Modulation Meter Calibrate
RV511; AWI adjust. See Vol. 9, Page 31 for correct procedure.

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SPECIFIC RADIO TUNE-UPS (Cont'd):

LAFAYETTE COMSTATE 525 (42-94302):

RX: RV1; SQ Range
RV3; S Meter

TX: Peak T3, T4, L7, L11, L12
RV2; AMC (disable C96)
RV4; RF Meter

MIDLAND 63-445:

RX: VR1; AGC
VR3; SQ Range
VR4; S Meter

TX: Peak L114, L113, L112, L109
VR5; AMC (disable R274)
VR2; RF Meter

MIDLAND 77-856:

Change '90 day wonder'
RX: VR1; AGC
VR2; S Meter adjust
VR3; Squelch range

TX: Peak - L16, L15, L12
VR5; AMC - if you can't get up, pull D21 (as a last resort pull C101)
VR4; RF Meter adjust

MIDLAND 77-861B:

RX: C33; IF gain
R50; Squelch range
R18; S meter adjust

TX: Peak - T1, T2, T3, L4
R57; AMC (defeat C53)
R13; Low power output adjust (set for 1.5W)
R17; RF meter (adjust to high power setting)

MIDLAND 7001 (79-007):

RX: RV4; AGC
RV5; SQ Range
RV3; S Meter

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SPECIFIC RADIO TUNE-UPS (Cont'd):

MIDLAND 7000 (79-007) cont'd:

TX: Peak (on USB) T1, T2, T3, T11, T4, T5, T6, T7, L10, L14, L16
RV6/RV7; Carrier Balance
RV1; Final Bias. Suggest changing final to 2SC1307
RV8; SSB Modulation
RV10; SSB ALC
VR1; AM Power
RV9; AM Modulation
RV2; RF Power Meter
RV501; AWI

MOTOROLA CF925AX:

Change final to 2SC1306 and put heatsink on driver if ther is room.

RX: VR101; AGC
VR103; Squelch range
VR102; S Meter adjust

TX: Peak; L10, L7, L6, L4, L3, L1
VR2; AMC - Really mic output lever, AMC is non-adjustable.
Pull R27, 1K resistor and R33, 100 Ohm resistor.

MOTOROLA MOCAT 40:

For all T4000 series, use SAMS 186
NOTE: Extender adjust is on 4005, 4020 only! Highly sensitive noise blanker, adjust is R502

RX: R229; Squelch range
Pull R120 (27 ohm); put 50 ohm variable resistor in place and use as S meter adjust.

TX: You either got it or you don't!
AMC Defeat: Pull VR305 (11.8V zener)
Pull CR206 - diode
Pull R306 (56K), put in 100K variable, use as RF meter adjust.
NOTE: This unit has plated through PC board - good luck!

NDI PC-102:

RX: VR201; SQ Range
VR102; S meter

TX: Peak T401, T402, T403, T501, T502, T503
VR203; AMC (defeat CR305, and C316 if necessary)
VR502; RF Meter

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SPECIFIC RADIO TUNE-UPS (Cont'd):

PACE 8003:

RX: VR109; IF AGC
VR101; RF AGC
VR102; SQ Range
VR103: S Meter

TX: Peak T503, T504, T302, L303, CT301, L304
VR201; AMC (disable C219)
VR301; RF Meter

PACE 8016:

RX: R114; Squelch range
R107; Meter zero
R108; S meter adjust

TX: Peak; L115, L114, L112, L109, L106
R168; AMC (defeat C178)
Pour it to this one - it has a 25 Watt Final!

PACE 8117:

RX R135; SQ Range
R137; S Meter

TX: Peak L301, T301, L302, T302, L304, L307, L308
R220; AMC (defeat CR201)
R325; RF Meter

PANASONIC RJ-3250:

Change '90 day wonder' on final.
Audio Board - remove R70 (variable 100K resistor) AMC control defeat.
RX: R24; Squelch range
R22; S meter adjust
R105; VU/Mod meter adjust

TX: Tune; L8 & L16 for maximum modulation
Peak; T11, T12, T13, T14, T15, FL1, L18
R73; RF meter adjust
NOTE: Do not exceed 6 watts dead key!

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SPECIFIC RADIO TUNE-UPS (Cont'd):

PANASONIC RJ-3600:

RX: R46; SQ Range
R143; S Meter
R163; VU/Mod Meter. Do not adjust until after TX adj.

TX: Change final to a 2SC1306, as original is only 1.5 Watt.
Peak T5, T6, T7, T9, T10, L7, L10, FL1, L11
R94; AMC (adjust to 90% if it won't go, L7 for maximum modulation
R146; RF Meter

RAY JEFFERSON CB-845:

RX: RV1; SQ Range
RV3; S Meter

TX: Peak L5, T3, T4, L7, L11, L12
RV2; AMC (defeat C96, 3.3uf Electrolytic)
RV501; SWR Cal. (150 Ohm 5Watt non-inductive resistor will equal a 3 SWR cal..
RV4; RF meter

RCA 14T303 (02A PLL chip):

RX: RV1b; SQ Range
RV3; S Meter

TX: Peak L5, T3, T4, L7, L11, L12*
RV2; AMC (C96, 3.3uf Electrolytic)
RV541; Modulation meter (cal with external meter)
RV502; RF Meter
RV501; 150 Ohm 5 watt non-inductive resistor, equals 3 on SWR cal.
*Repeak clockwise L7
*Repeak counter-clockwise L12

REALISTIC TRC-428:

RX: VR3; IF Gain
VR6; SQ Range
VR8; S Meter
VR401; SWR Meter Calibrate

TX: Peak T10, T12, T13, L5, L8
(There is no AMC adjustment. If it won't come up by tuning L5 and L8, pull both R90 and R104)
(There is no RF Meter adjustment. Pull R3, put in a 100 ohm variable in place and adjust.)

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SPECIFIC RADIO TUNE-UPS (Cont'd):

REALISTIC TRC-432:

RX: VR301; Power supply voltage adjustment, 13.8V max.
VR302; SQ Range
VR4; IF Gain
VR5; S Meter

TX: Peak T12, L5, L4, L3
AMC adjustment; Cut collector of Q10

REALISTIC TRC-441:

Change final to 2SC1306. Change all thin plastic insulators on heat sinks to Mica insulators.

RX: VR3; S Meter
VR5; SQ Range
VR2; IF Gain

TX: Peak T113, T114, L107, L104
(There is no AMC adjustment). Remove D110, DO NOT remove C146.
VR1; RF Meter Adjustment

REALISTIC TRC-490 (21-1583):

NOTE: Unit has an MB8734 P11 chip - for frequency & slider Modification, see Volume 7, pages 18-22 (Courier Galaxy)
Change '90 day wonders' on final & driver; also under chassis check TR25 and TR26. In P/S TR303, some are sinked wrong.
Change final to 2SC1307 if you are going to push unit.

RX: VR1; S Meter adjust
VR12; Squelch range

TX: Peak L26, L27, L28, L29, L36- Do not touch L39 (TVI)
VR3; TX frequency adjust
VR8; Driver bias
VR9; Final Bias
VR5; Carrier balance
VR7; RF ALC (Don't exceed 15W in SSB, and 7W in AM unless final has been changed.
VR6; AM Power
VR10; Rf Meter adjust
For modulation increase - cut R102 (15K) located to right of L17.

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SPECIFIC RADIO TUNE-UPS (Cont'd):

ROBYN WV-110 (Update):

NOTE: TX circuits on separate PC board. Change final to 2SC1306. Try to use a heat sink on the driver.

RX: VR2; Squelch range
VR5; S Meter adjust

TX: Peak L18, L17, L16, L15, L13, L12, L11, L10
DO NOT touch L9 (TVI)
VR6; AMC
Defeat; C86 & TR18, both on main board (TR18 is heatsinked)
VR4; RF meter adjust
For additional frequencies - Pin 10 & 11 of PLL to Pin 1 of PLL.

ROYCE 1-655:

NOTE: This unit has vertical circuit board - Good Luck!

TX: Peak; T401, T402, L403, L404
Modulation Defeat - C301, 1mfd electrolytic.

SEARS 934.38061700 (CM-2378SA):

NOTE: Unit is identical to 934.38062700. Only difference is no PA/CB capability. Use SAMS 236, see Secret CB Volume 8, pages 68 & 69 for frequency modification.

RX: RT1; IF gain
RT2; S meter adjust

TX: Peak; T11, T12, T13, T14, T15
RT3; RF meter adjust
D7; AMC defeat, if needed.

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Radio Modulation Adjustments for Various Brands/Models

BRAND	MODEL	MODULATION ADJUSTMENT
Unimetric	Dolphone	Open D11
Audiovox	Winsor	Open D12
Audiovox	100	Open D12
Regency	CR186	Open D9
Gemtronics	4040	Open D481
Courier	Centurian 40	Open D24
Xtal	CB-11	Open D14
Xtal	CB-7	Open D18
Kraco	4020	Remove Q15
Kraco	2310A	Remove Q122
Standard	29A	Open D219
Zexon	49	Remove Q201
Palomar	49	Remove Q201
Nessco		Remove Q201
Truetone	8334	Remove Q15
Tram	D201	Adjust VR77
Fairmate		Open D8
RCA	147304	Remove Q15
Surveyor	2400	Open D12
Claricon	Privateer	Open CR107
DaK	IX Old Type	Remove Q202
DaK	X	Remove Q37, Q38
Courier Chief	23	Remove X8
Fannon	SFT 400/500	Open D10
Robyn	123C	Open D11
Courier	Centurion	Open D46
Raider	404R	Open D52
Kris	XL50	Remove Q303
Midland	882	Remove Q15
	866	Remove TR8
	883	Remove X11
	874	Remove X11
	867	Remove D14
Cobra	21A (old)	Open D24
	25GTL	Remove TR14
	29A (old)	Open D24
	85	Open D9
	27 (old)	Short X8
	134	Open D40
	6	Open D10
	21XLR	Remove TR20
Royce	602	Open D6
	603	Remove Q205
	609	Remove Q205
	610	Open D202
	630	Short C79, D42, D44
	639	Remove Q16
	648	Open C82, C35,C96
	653D	Short D301
Royce	682	Short D301

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RADIO MODULATION ADJUSTMENTS FOR VARIOUS BRAND/MODELS (CONT)

BRAND	MODEL	MODULATION ADJUSTMENT
Royce	606	Open D16
	607	Remove Q201
	604	Remove Q205
	613	Remove Q205
	651	Remove Q205
Realistic	TRC 52	Open D11
	467	Open D111
	456	Remove Q505
	452	Open D218
	420	Remove Q107
	29	Open D10
	443	Remove X3
	46	Remove D52, Q29
	61	Open D12
Sears	Roadtalker 40	Open D501
	CM 6000LC	Open D7
	CM 6000SL	Short D8, remove cap from collector of Q15
	CM 2378SA	Remove Q7
Pearce Simpson	Cheetah SSB	Open D44, D46, D55
	Tiger 23C	Open D12
	Tiger 23D	Open D10
	Cougar 233	Open D16
	Director	Open X22
	Bobcat 23D	Open D8
	Super Lynx	Open D12
	Bearcat 23C	Open D16
	Panther SSB	Open D53
	Bengal	Open D45
Johnson	123A	Open CR11
	250	Open CR11
	123	Open D7
	320	Remove X11
	110	Remove X11
	300	Remove X8
	323	Remove X11
	124	Open D17
	125	Open D5
	120	Open CR5
	121	Open CR5
	323M	Open D17
	130	Open CR11
	4120	Open CR12
	4125	Open CR 12
	4230	Open CR12

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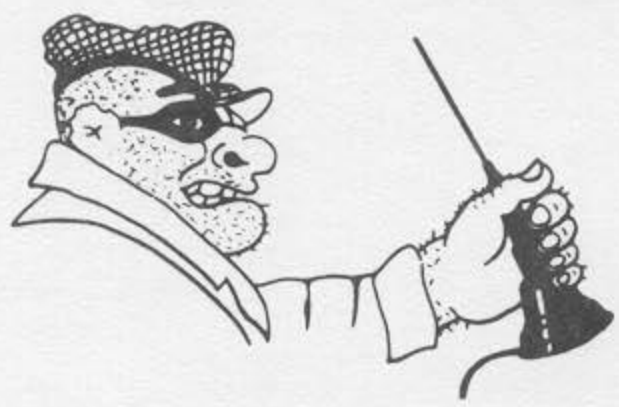
RADIO MODULATION ADJUSTMENTS FOR VARIOUS BRAND/MODELS (CONT)

BRAND	MODEL	MODULATION ADJUSTMENT
Lafayette	LM100	Remove TR14
	SSB140	Remove Q37, Q8
	LM300	Remove Q17
	MB740	Remove Q15
	Comphone 23	Open D11
	HB625	Short R11
	Micro 723	Open diode behind L102
Hygain	2703	Remove Q15
Hygain	2705	Remove Q37, Q38, Short D12
SBE	26CD	Remove Q901
SBE	22CB	Remove CR107
Pace	123A	Open D8
President	Washington (old)	Remove TR23 (AM), Short D46 (SSB)
GE	5914D	Remove Q14

BANDIT BELIEVER

THE PERFORMANCE OF THE BANDIT ANTENNA IS TERRIFIC SAYS A HAWAII DEALER. THE "BANDIT" OUT PERFORMES ANY ANTENNA THAT I HAVE USED. THE NAME BRAND I WON'T MENTION SHOWED ONLY 3DB RATING ON MY BASE STATION, WHEN I SWITCHED TO THE "BANDIT" ANTENNA THERE WAS A BIG DIFFERENCE AND IT GAINED A 6DB RATING. IT HAD DOUBLED! FOR EVERY "BANDIT" ANTENNA WE HAVE INSTALLED THE AUDIO AND SIGNAL STRENGHT HAD A TREMENDOUS INCREASE. HATS OFF TO LAMTECH FOR A VERY GOOD ANTENNA AND KEEP IT UP. ALSO BECAUSE OF THE TUNING RINGS IT WAS ALWAYS POSSIBLE TO GET IT TUNED TO A 1 FLAT. OUR CUSTOMERS ARE HAPPY.

THE BANDIT



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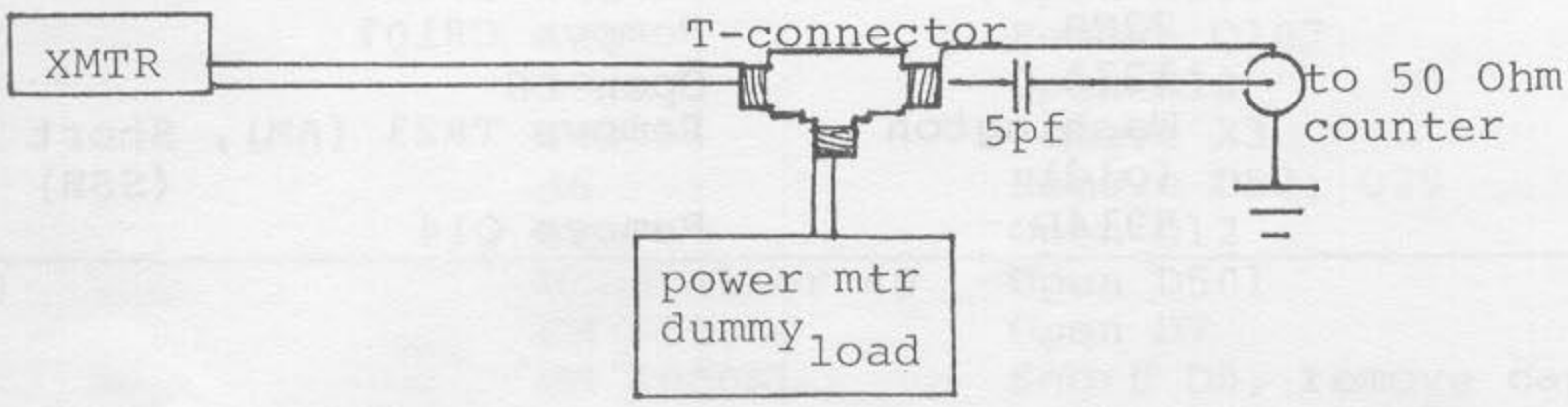
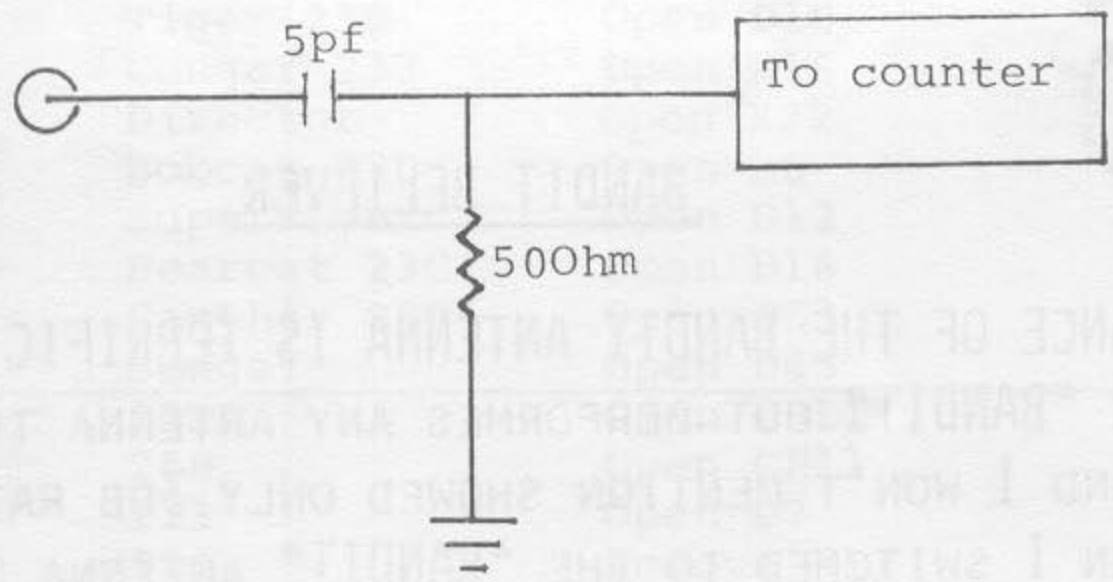
HINTS ON SERVICING

When servicing a "wireless-modular" radio such as the Royce 655, you will find troubleshooting of a particular module alot easier if you unsolder the terminal pins, remove the module and solder the pins on the other side of the "mother board" in the same direction. Now you have lots of room to work.

FREQUENCY METER HOOK-UP



Use this for high impedance counter



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SERVICE NOTES

Golden Eagle Mark IV Transmitter

SYMPTOM:

Excessive arcing of the high voltage contacts of the relay.

Solution:

Remove CD601 (1N4005 diode), presently connected with its cathode to the junction of R317, and R319 and its anode to ground.

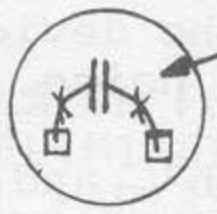
Reconnect the cathode to the junction of R316 (1.5K labeled R327 on the board), and the orange and pink wires that go to the mode switch and relay. Connect the anode to ground. This will shunt to ground a negative pulse that can exceed the voltage rating of the contact.

For factory parts contact:

Nichols Electronics
School Street
Tilton, NH 03276
603 286-4421

D104 AND D104M6 ASTATIC MIKE MODIFICATION

To increase modulation and voice quality, clip the 250pf capacitor located on the back of the crystal cartridge.



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HOW TO SOLVE NOISE PROBLEMS

Noises from an automobile ignition system can be catagorized as:

A. Pulse Noise.
   Sources: spark plugs, coil, high voltage wiring.
   Erratic sources: voltage regulators (mechanical type), switch noise, blinkers.

B. Continuous Noise.
   Sources: generator (alternator), fan, wipers.

To avoid long hours of fruitless labor, be sure the ignition system is in good working order and properly tuned before going any further.

Spark plug cables should be checked or replace every 15,000 miles. A good cable will read between 10K Ohm and 12K Ohm on an Ohmmeter.

A good place to start with noise troubleshooting is to first unscrew the antenna coax from the CB unit and then see if the noise goes away. If it does, the noise is not comming in on the DC power lead, but from radiated RF interference. Check for these:

1) Is the coax shield wire connected to the chassis at the antenna end?

2) Is the shield wire connection broken or corroded?

3) Is anntenna mounted on a poor ground, such as a mirror, luggage rack, or bumper? Always install braided shielding between a suspected poor ground and a known good ground such as the main chassis.

4) Noise often comes from poorly grounded metal on the car body. Install ground straps on hood hinges, trunk hinges, doors, exhaust system (front and rear), and the motor mounts.

An easy way to locate noise caused by radiation is to use a walkie-talkie as a noise receiver. Pull out the antenna about 6" and walk around the body, holding the antenna around various suspected areas while listening to changes in the speaker. Check any bad areas and install ground straps as necessary.

DC NOISE

Remember this important advice- noise suppression, ostensibly, is more effective when applied to the device producing the noise, than to the device receiving the noise.

An alternator produces both "hash", and "whine". The whine is actually a ripple voltage superimposed on the DC line. Coaxial high-current feedthrough capacitors are the best way to go.

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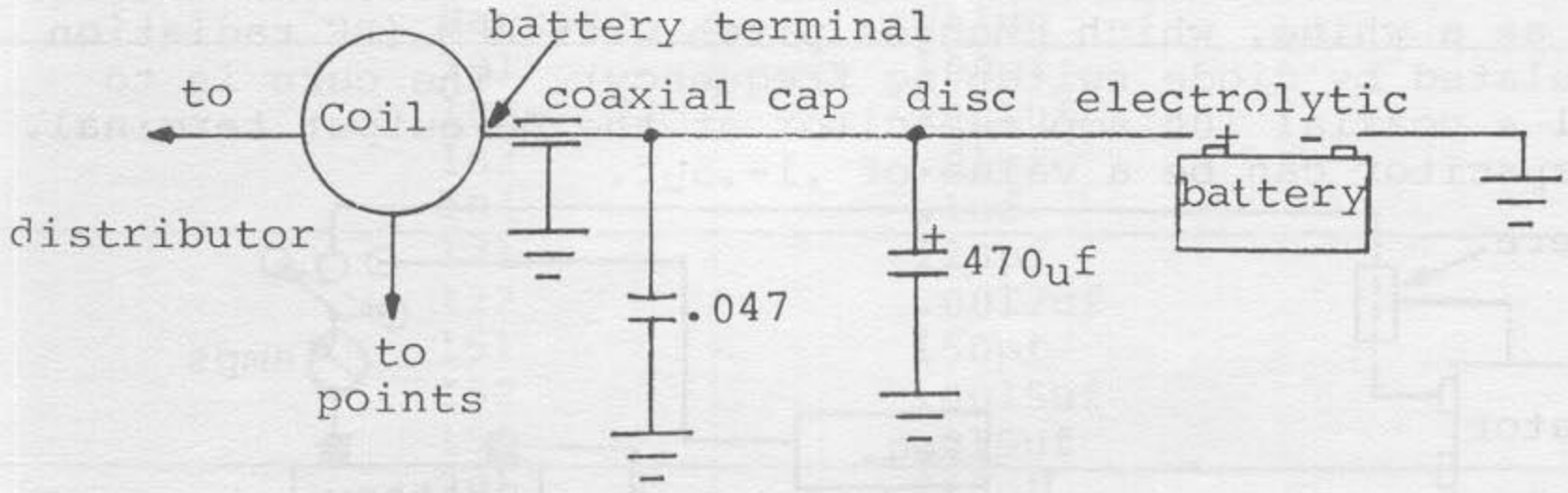
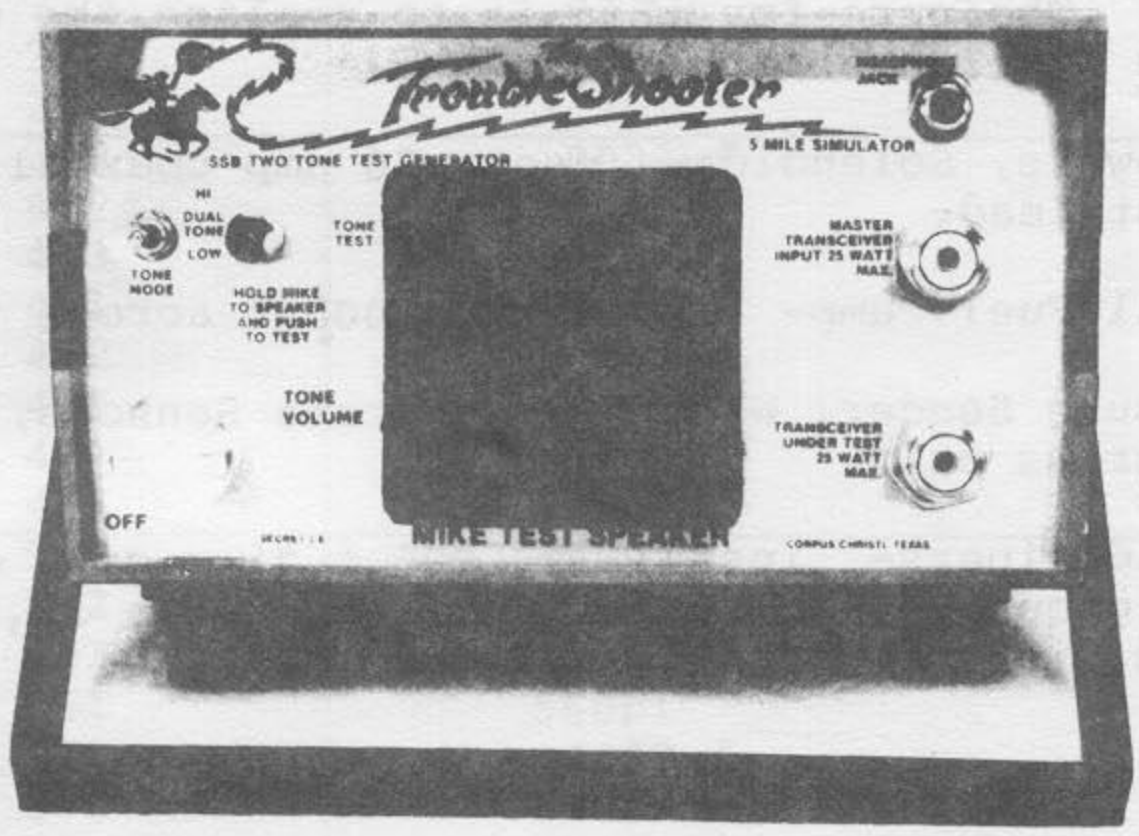
HOW TO SOLVE NOISE PROBLEMS (CONT)

Most noise can be elimated by using a separate heavy guage power wire from the CB to the battery to eliminate voltage drops.



One more method to reduce noise can be done if you use your radio on negative ground systems only. That is to go through and short across all the bypass capacitors so the chassis is grounded.

NOW AVAILABLE FULLY ASSEMBLED:



UNIT FEATURES A 5 MILE SIMULATOR FOR TRANSMITTER/RECEIVER TESTS (20 MILE SIMULATOR HAS BEEN ELIMINATED FROM PRODUCTION MODEL DUE TO UNAVAILABILITY OF SPECIAL PARTS); DUAL TEST TONES FOR TUNE-UPS; HEADPHONE OUTPUT JACK FOR MODULATION AUDIO CHECKS; DUAL 25 WATT DUMMY LOADS; WORKS ON INTERNAL 9V BATTERY AND HAS A JACK FOR OPTIONAL AC ADAPTOR.

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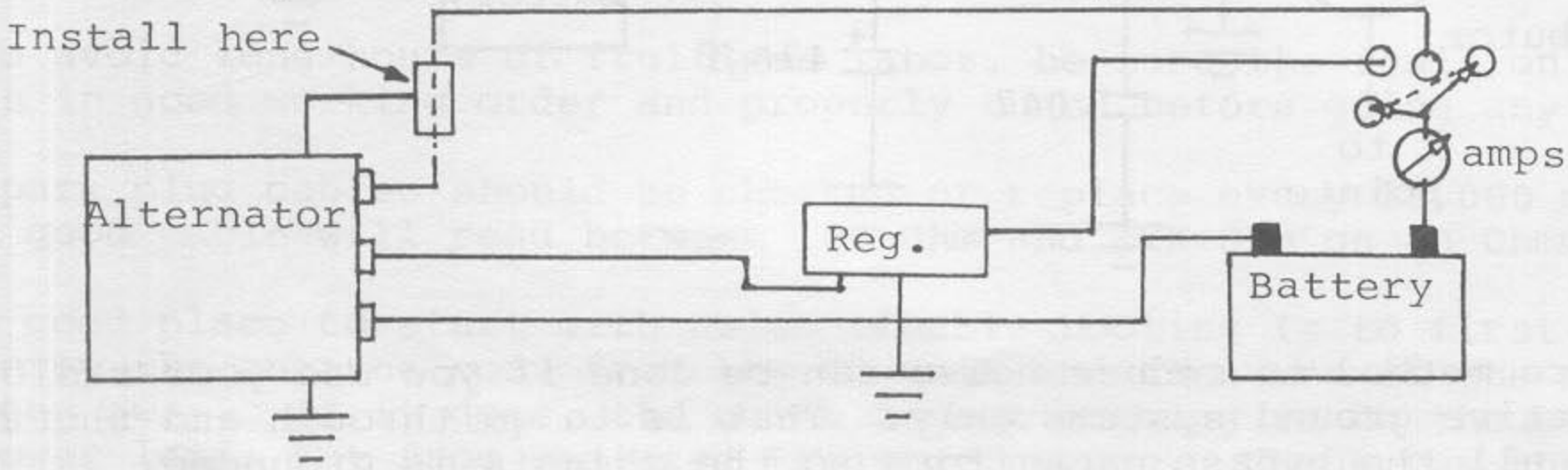
NOISE IN DIESEL TRUCKS

Diesel engines do not have noise-producing high-energy ignition systems and therefore have less of a radiated noise problem. However, there are still noise sources to be found.

1) Alternator- polish and smooth Slip-rings, replace brushes. Most of the noise comes from the rectifier diodes. It will appear as a whine, which changes pitch with RPM (RF radiation is modulated by diode switching frequency). The cure is to install a coaxial 100 amp capacitor at the DC output terminal. This capacitor can be a value of .1-.5$_u$f.



If your rig has a generator instead, periodic dressing of the commutator, along with replacing the brushes as required for proper mantainence. Add a .005$_u$f capacitor across the DC output line and ground.

If you have a noisy regulator, remove the wire from the regulator to the FIELD terminal on the alternator. DO NOT put a capacitor in this line! The cure for this is to replace the wire with coax, grounding the shield at both ends.

2) Fans, Blowers, Solenoids- use a 20 amp coaxial capacitor in the hot lead.

3) Electrical Fuel Pump- install a .005$_u$f across the motor.

4) Oil Pressure Sender, Water Temperature Sensors, etc.- Install .005$_u$f across unit.

5) Windshield wipers- install a .005$_u$f disc cap. on all hot wires to ground. For stubborn cases, use a .1$_u$f coaxial cap. in series with the offending lead.

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IN-HOUSE VALUE LISTING

Below is a listing of capacitor numbers with the corresponding value. Now you can use those junk-box caps, and have the value.

Marking	Value
101	100pf
102	.001uf
103	.01uf
104	.1uf
121	120pf
122	.0012uf
151	150pf
152	.0015uf
153	.015uf
201	200pf
202	.002uf
203	.02uf
221	220pf
222	.0022uf
223	.022uf
224	.22uf
225	2.2uf
253	.025uf
303	.03uf
331	330pf
332	.0033uf
333	.033uf
334	.33uf
335	3.3uf
392	.0039uf
402	.004uf
403	.04uf
471	470pf
472	.0047uf
473	.047uf
474	.47uf
475	4.7uf
501	500pf
502	.005uf
503	.05uf
561	560pf
622	.0062uf
680	680pf
751	750pf
801	800pf
822	.0082uf

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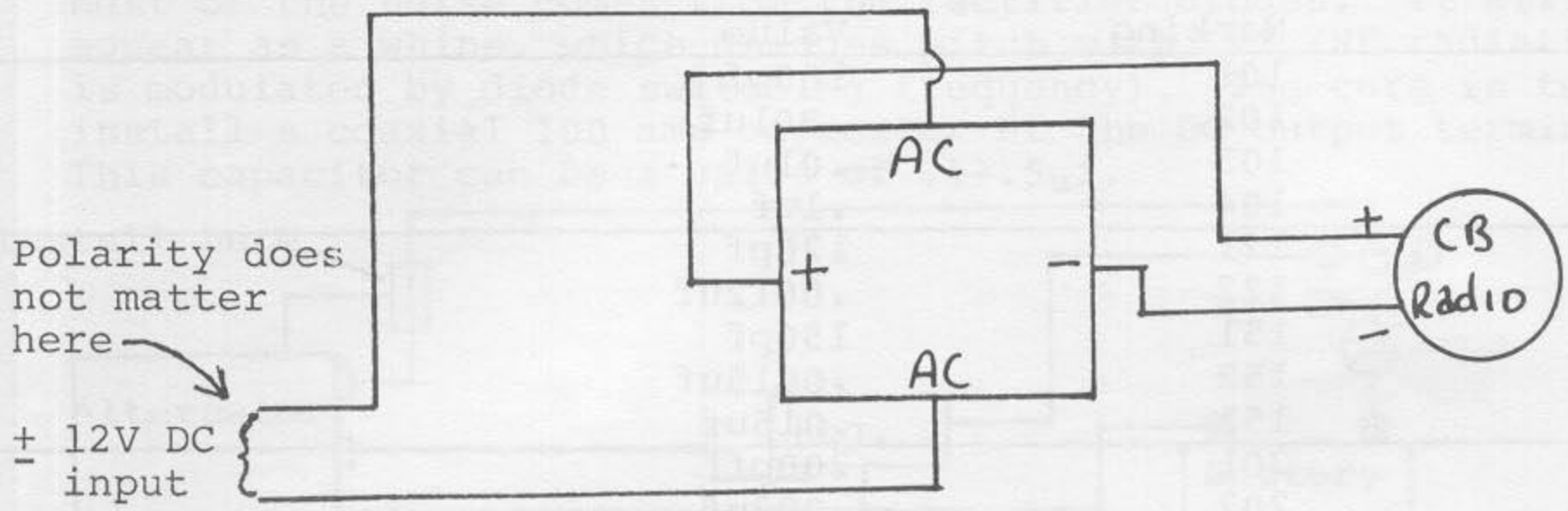
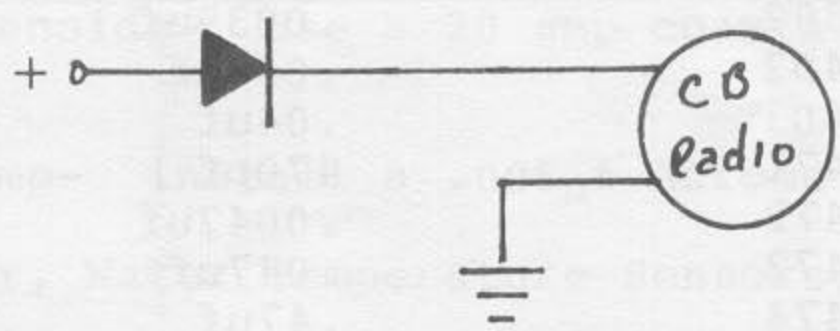
TRUCKERS SPECIAL POLARITY PROTECTOR WITH SMARTS!

Never again will you have to go through the agony of hooking your rig up backward. Do this simple modification, and relax.



Bridge Rectifier - 25amp, 25 PRV
Mount inside chassis.

One more simple way to protect your "rig".



If connected up backwards, nothing will happen due to reverse bias which causes blocking action of diode. When connected properly, diode conducts, and radio will be ON.

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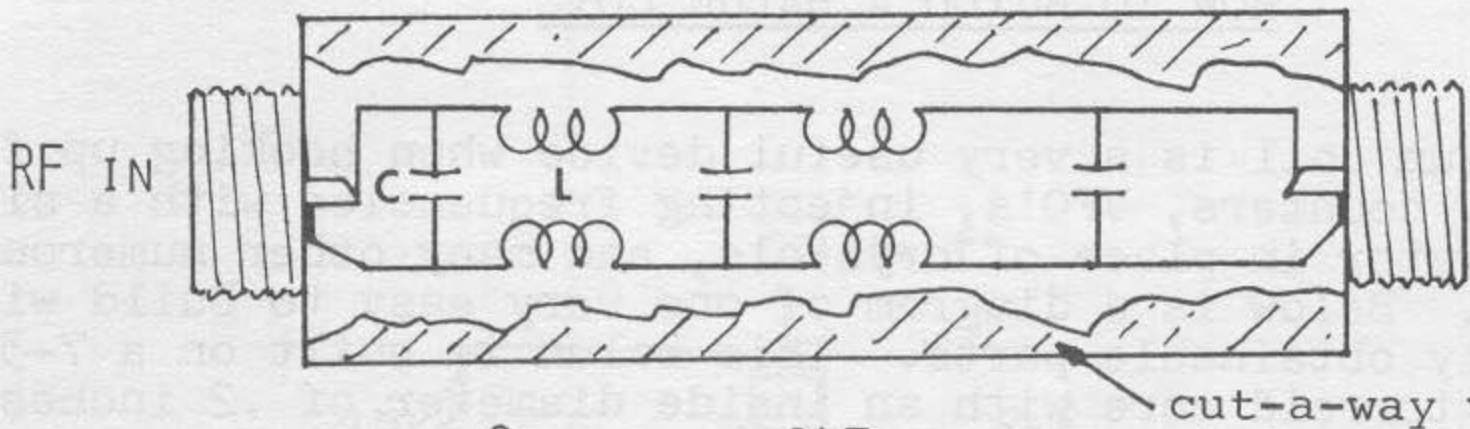
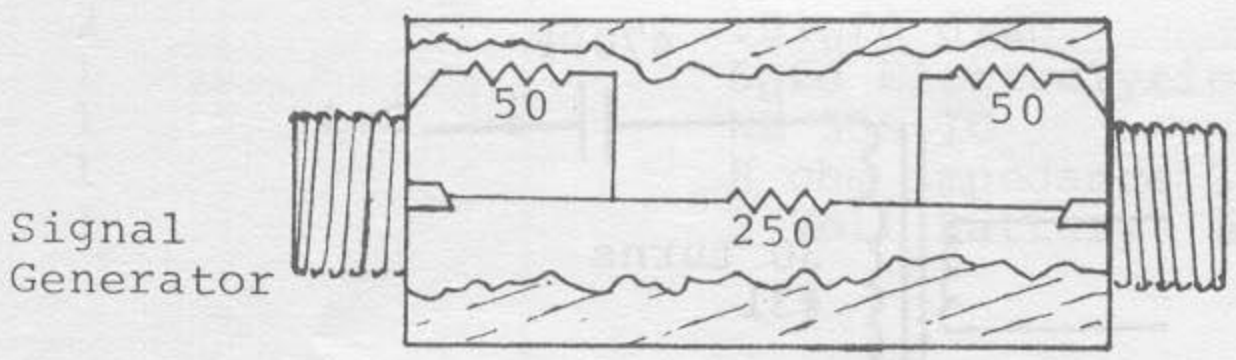
BUILD A LOW-PASS FILTER AND KEEP THE NEIGHBORS HAPPY!



C VALUE= .047 CERAMIC
L VALUE= 25$_u$H COIL

USE SO239 ON INPUT AND OUTPUT. INSTALL IN ALUMINUM MINI-BOX.

20 dB ATTENUATION PAD



All resistors are carbon, ½ watt rating.

Build in a small aluminum mini project box, or wrap brass sheeting around the circuitry, and solder all edges. Keep everything as short and tight as possible.

Now, 100$_u$Volt range becomes 10$_u$Volt, with 20dB pad inserted. The most important thing is to get it completely shielded.

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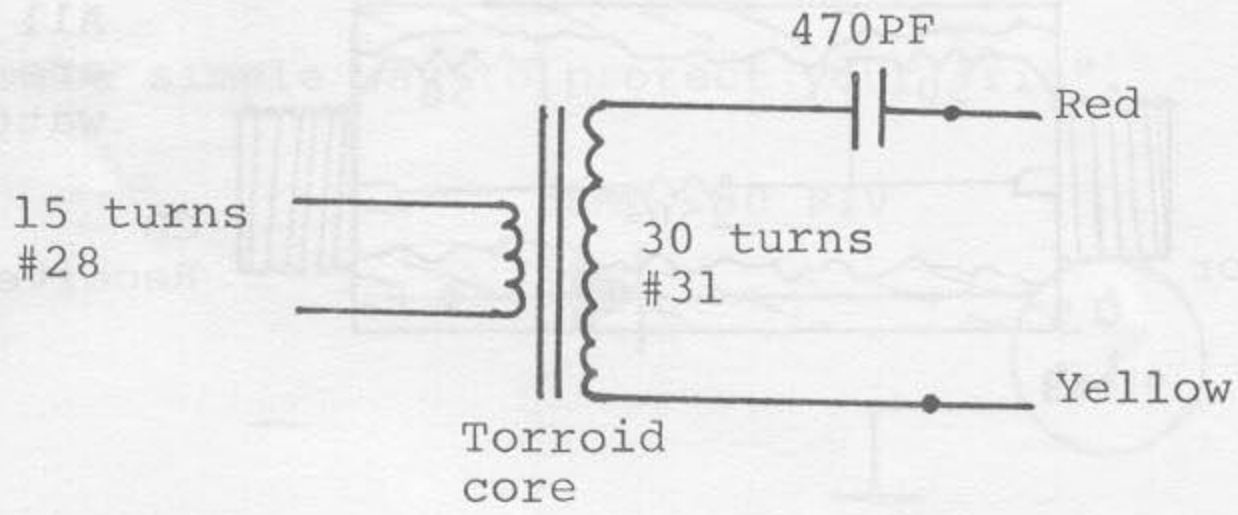
HOW TO BUILD A BALUN COIL

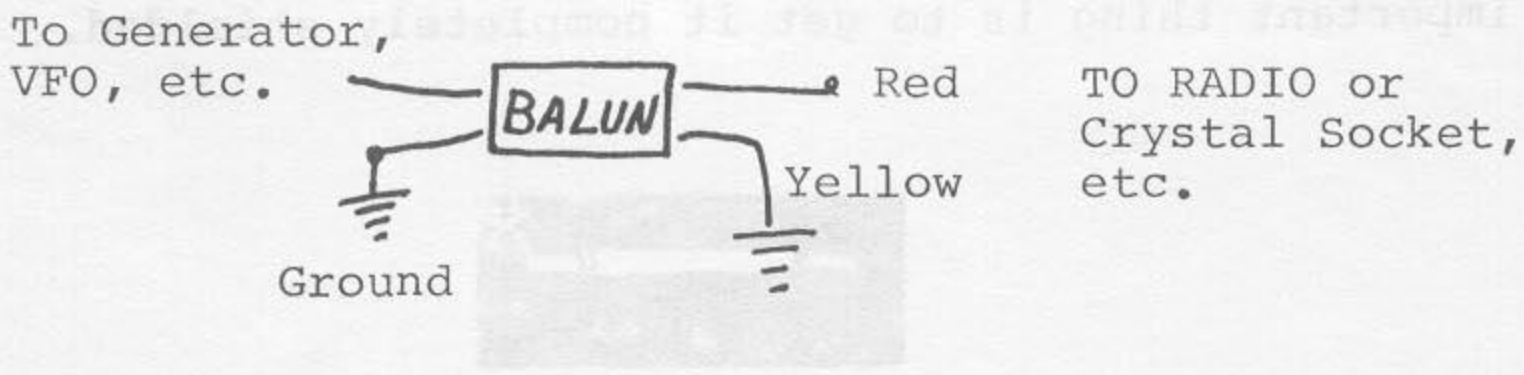
A balun coil is a very useful device when hooking up frequency counters, VFO's, injecting frequencies with a signal generator in place of crystals, and many other numerous uses. Below is a diagram of one very easy to build with easily obtainable parts. This balun is built on a 7-30 Mhz. torroid core with an inside diameter of .2 inches and an outside diameter of .4 inches. The core thickness is .125 inches. Following is a complete list of materials that you will need to build your own.

#28 and # 31 enamelled magnet wire
torroid core, as above (Miller #F-37-1)
470pf ceramic disc capacitor
#22 Red and Yellow wire

This design has a step-up ratio of 2:1. After you are finished winding the coil, cover with heatshrink for a professional looking, highly useful accessory.



HOW TO HOOK UP CORRECTLY



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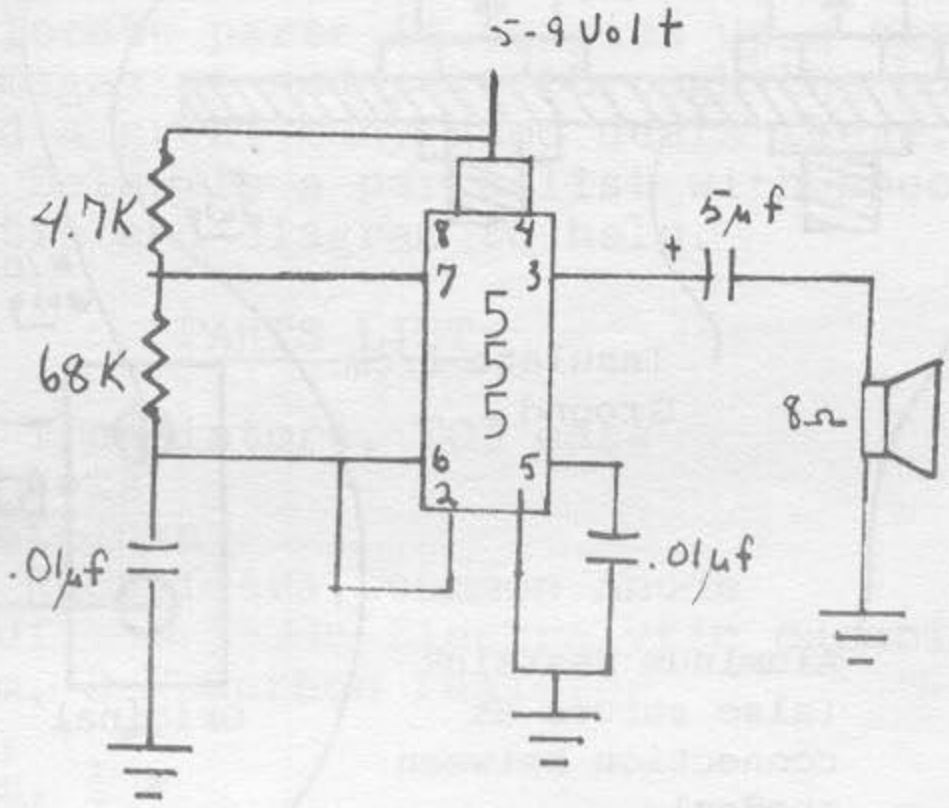
EASY-TO-BUILD CIRCUIT

E-Z 1000Hz. Tone



Parts List:

1	4700 ohm ¼watt res.
1	68K ohm ¼watt res.
2	.01$_u$fd disc
1	5$_u$fd Electrolytic Cap. 16 Volt
1	NE 555 IC
1	8 ohm impedance 3" Speaker
1	9 Volt Battery

IF you want to have some fun? - replace the 68K fixed resistor with a 100K variable resistor to have a wide range of tones. Also, the capacitor off of pin 6 to ground can be changed for different tones.

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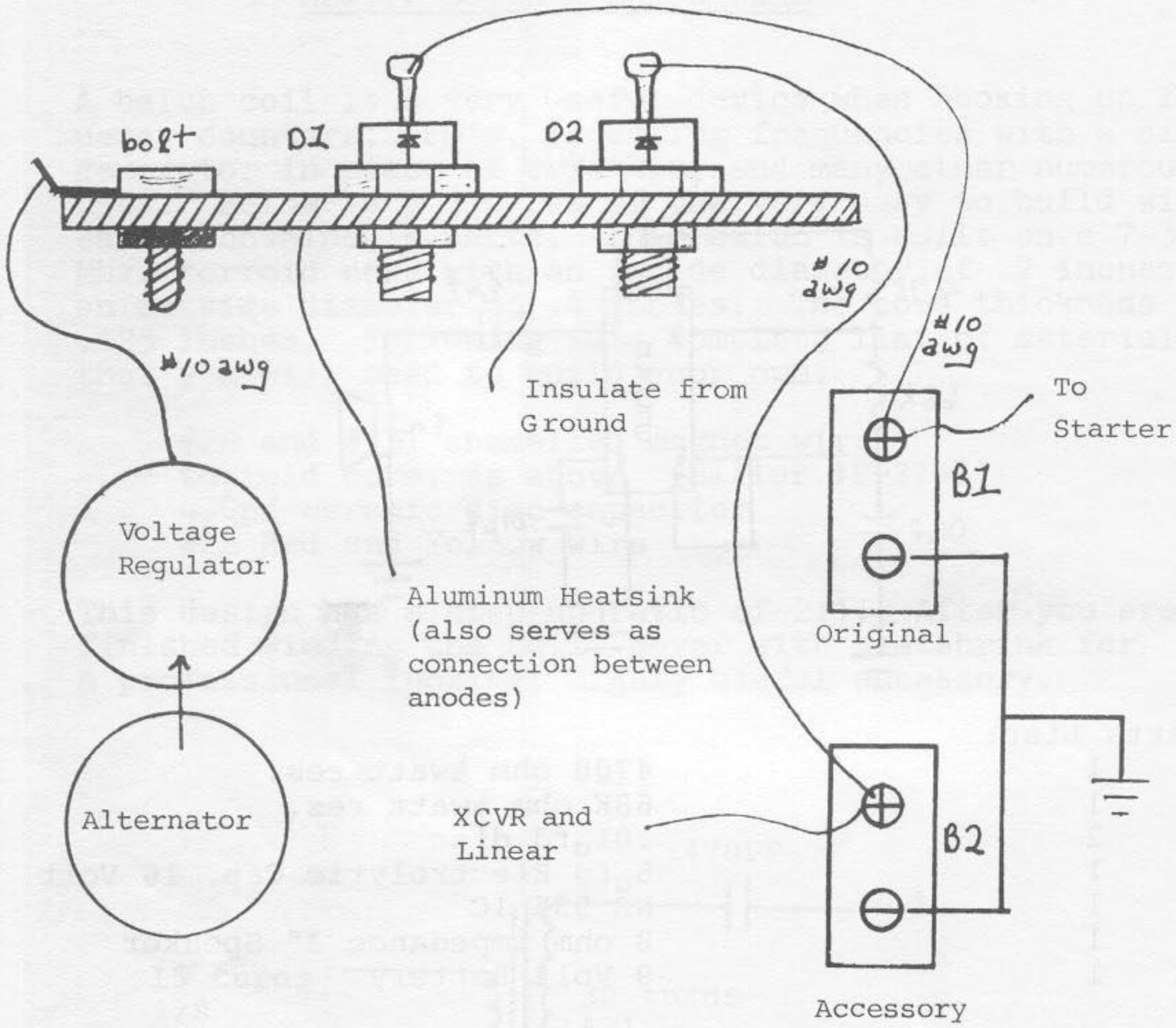
How To Add a Second Battery To Your Auto For Acessories And Linears



D1 and D2 act as one way switches. The action of these two is that of isolating the independent batteries from both discharging. Select high current common ANODE type stud rectifiers- such as those available from Poly-Paks(150 amps, 25PIV).

The diodes should be mounted on a piece of aluminum heatsink and wired with 10 gauge copperwire as shown above. Install them in a box of some sort, to prevent shorting out to ground.

If you use common CATHODE diodes, you will have to isolate the two diodes from each other and connect the anodes together. Use a separate heat sink for each diode in this case.

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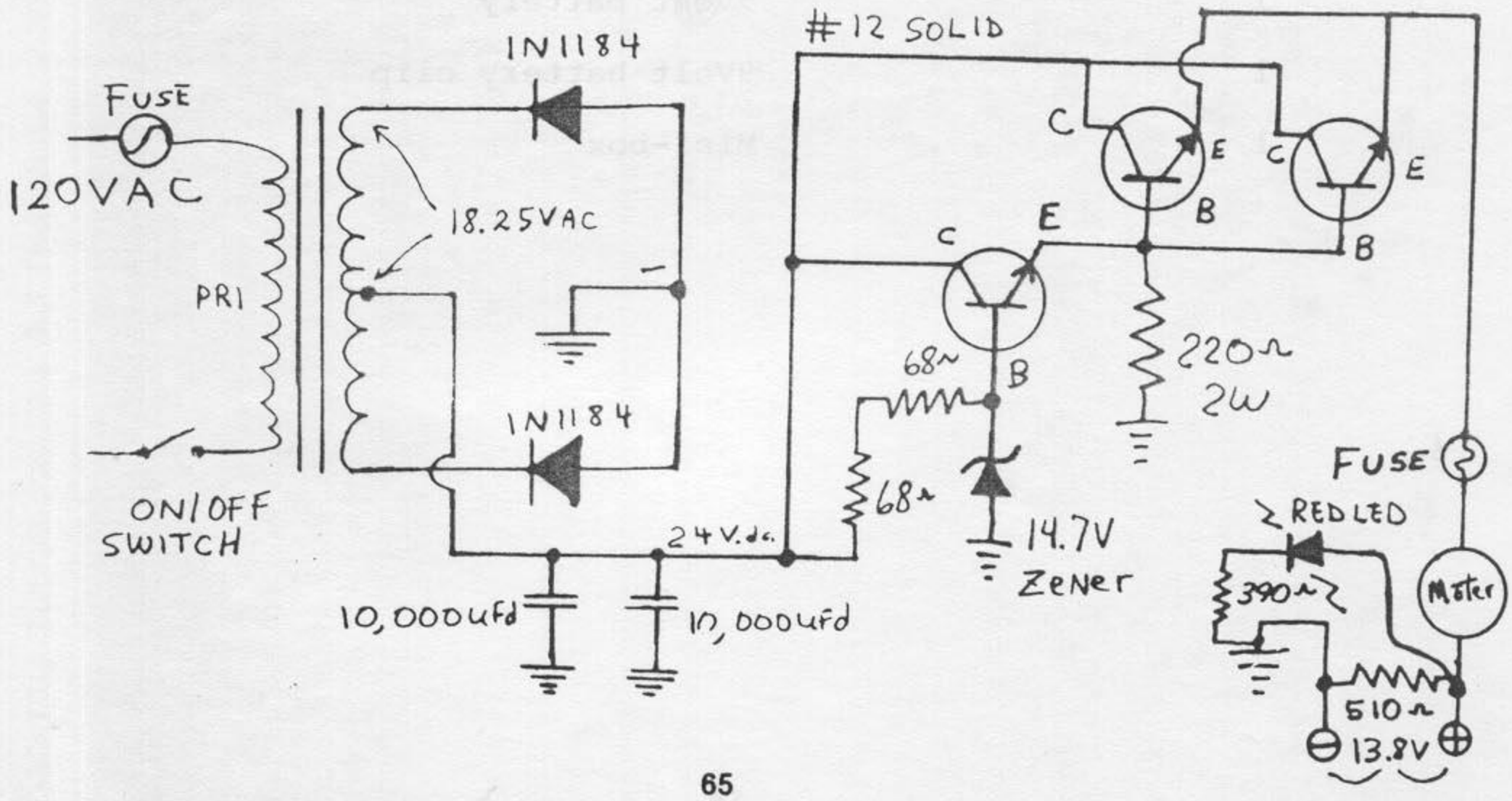
SECRET CB'S SUPER 20 POWER SUPPLY--HOW TO BUILD SERIES

In this series we will show you how to save a lot of hard earned bucks and come out with an outstanding 20 amp regulated power supply. All the parts are easy to find and are common in discount flyers from such suppliers as POLY PAKS (P.O. Box 942, South Lynnfield, MA. 01940) or SOLID STATE SALES (P.O. Box 74D, Somerville, Mass. 02143). The best way to locate parts is to pick up a copy of RADIO ELECTRONICS magazine and page through the ads in the back. You will find a great many good deals there. Now, back to building. Below is a parts list with specifications and a schematic and diagram to help.

PARTS LIST

3	2N3055 Transistors, TO3 case
3	TO3 Sockets
3	TO3 Heatsinks
2	1N1184 Rectifiers, common Anode
2	10,000ufd. @ 35Vdc Electrolytic capacitors
1	220 ohm, 2 W Carbon resistor
2	68 ohm, 1 W
1	390 ohm, ¼ W
1	510 ohm, ¼ W
1	14.7V ½ W Zener diode
1	Power Transformer, 120V Pri./ 36.5V C.T. Sec. 20A
1	RED LED, Jumbo
2	Chassis-mount fuseholders
1	0-20A ammeter, optional
1	Case, your choice
	Misc. hardware, connecting wire as necessary

SCHMETIC:



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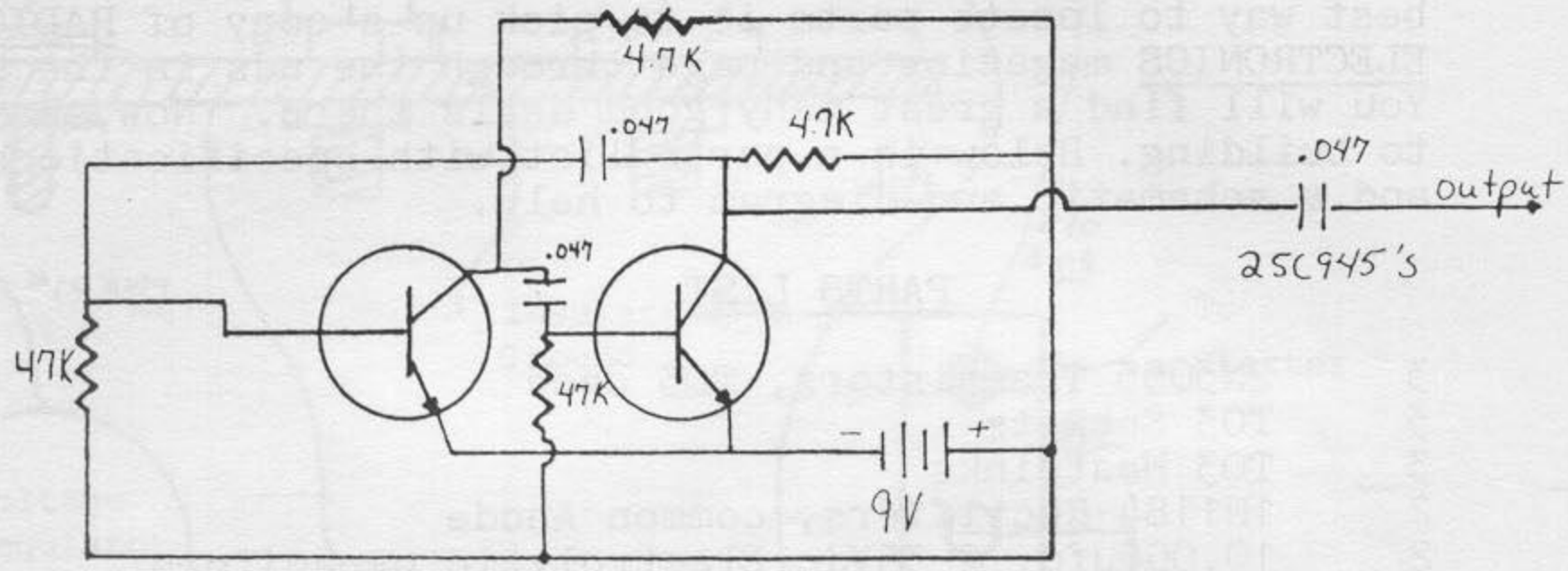
Signal Injector

Build this simple device to use as a signal injector for troubleshooting. The output is rich in harmonics.



Parts Needed

2	2SC945
2	47K ohm
2	4.7K ohm
3	.047$_u$f disc capacitor
1	perfboard (1X1)
1	9Volt battery
1	9Volt battery clip
1	Mini-box

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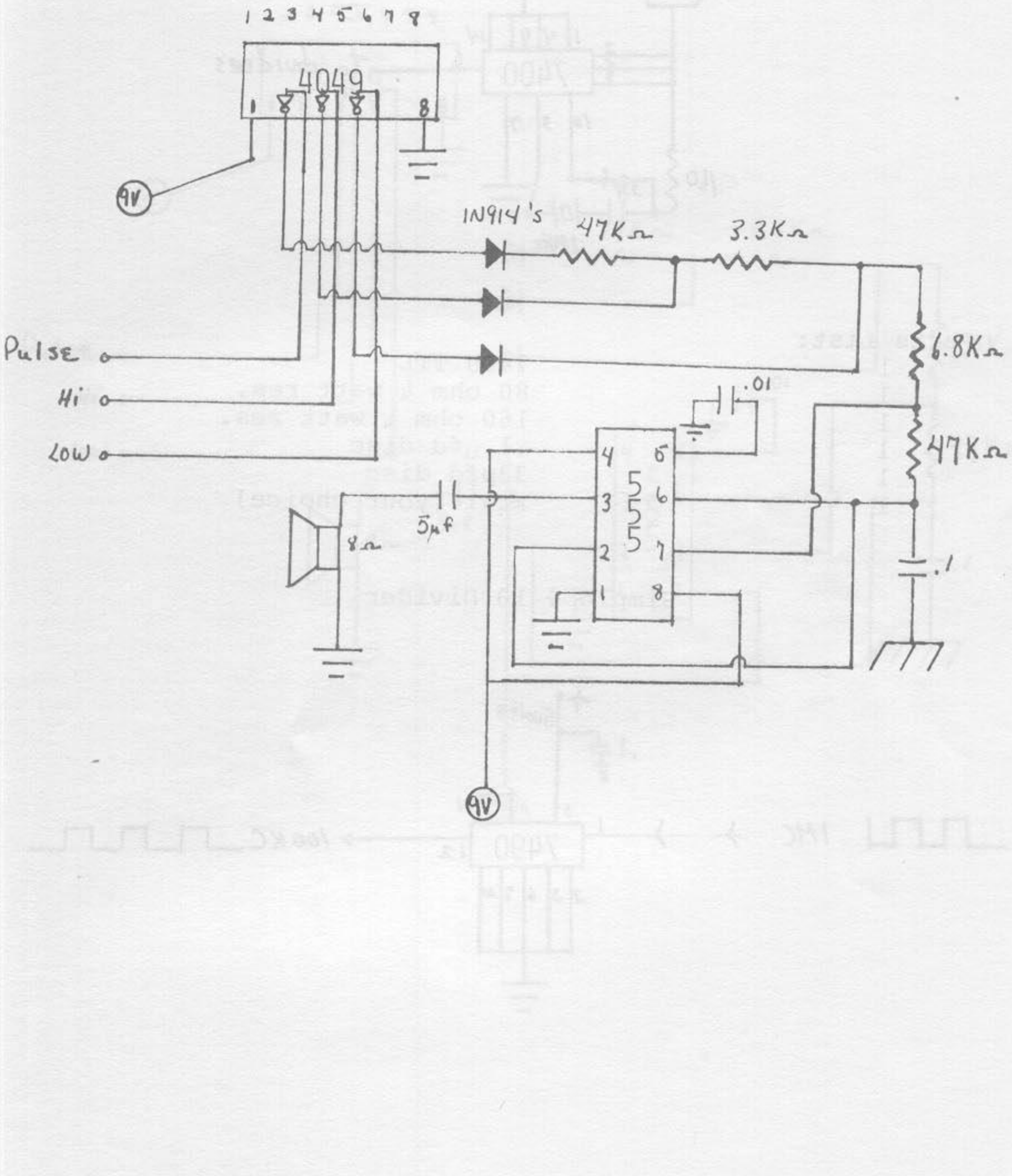
Build An Audio CMOS Logic Probe



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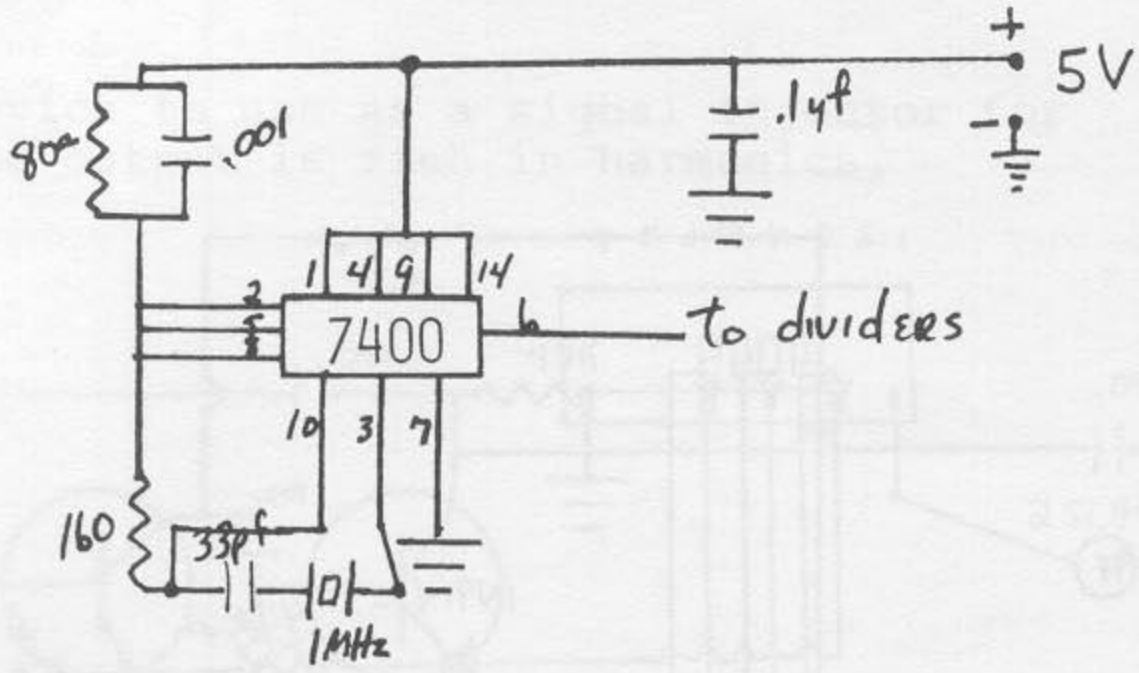
HANDY TTL CIRCUITS

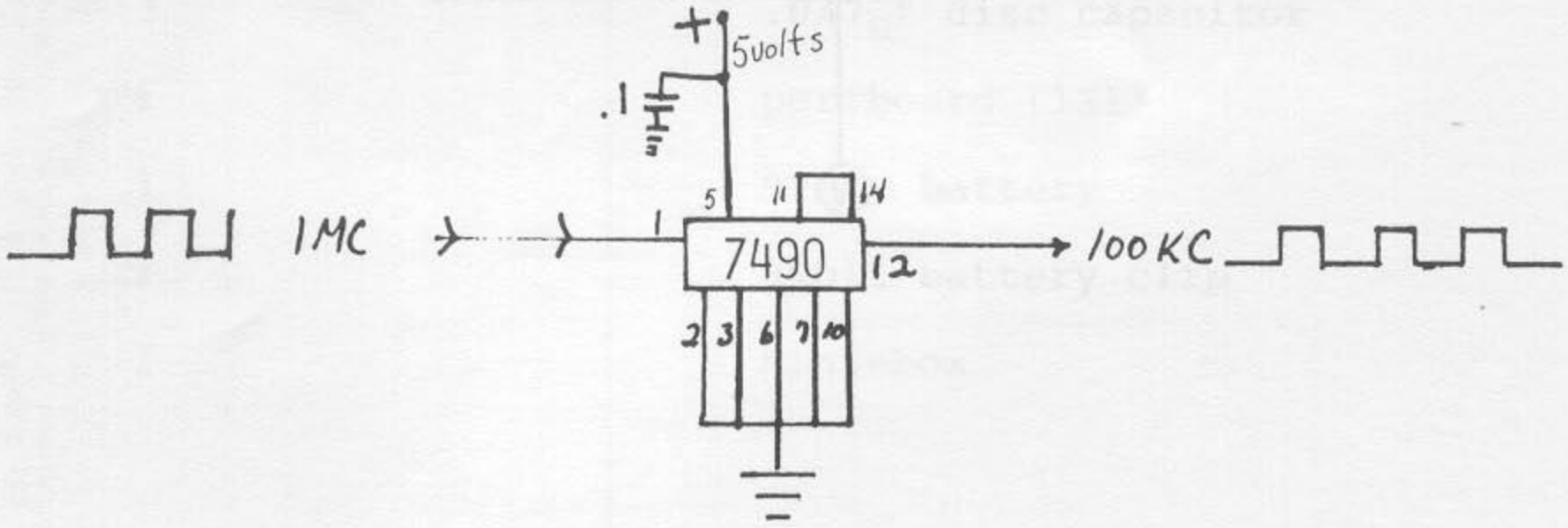
Easy to build Reference, or Marker OSC



Parts List:

1	7400 TTL
1	80 ohm ¼ watt res.
1	160 ohm ¼ watt res.
1	.1 ufd disc
1	33pfd disc
1	xtal (your choice)

Simple ÷ 10 Divider



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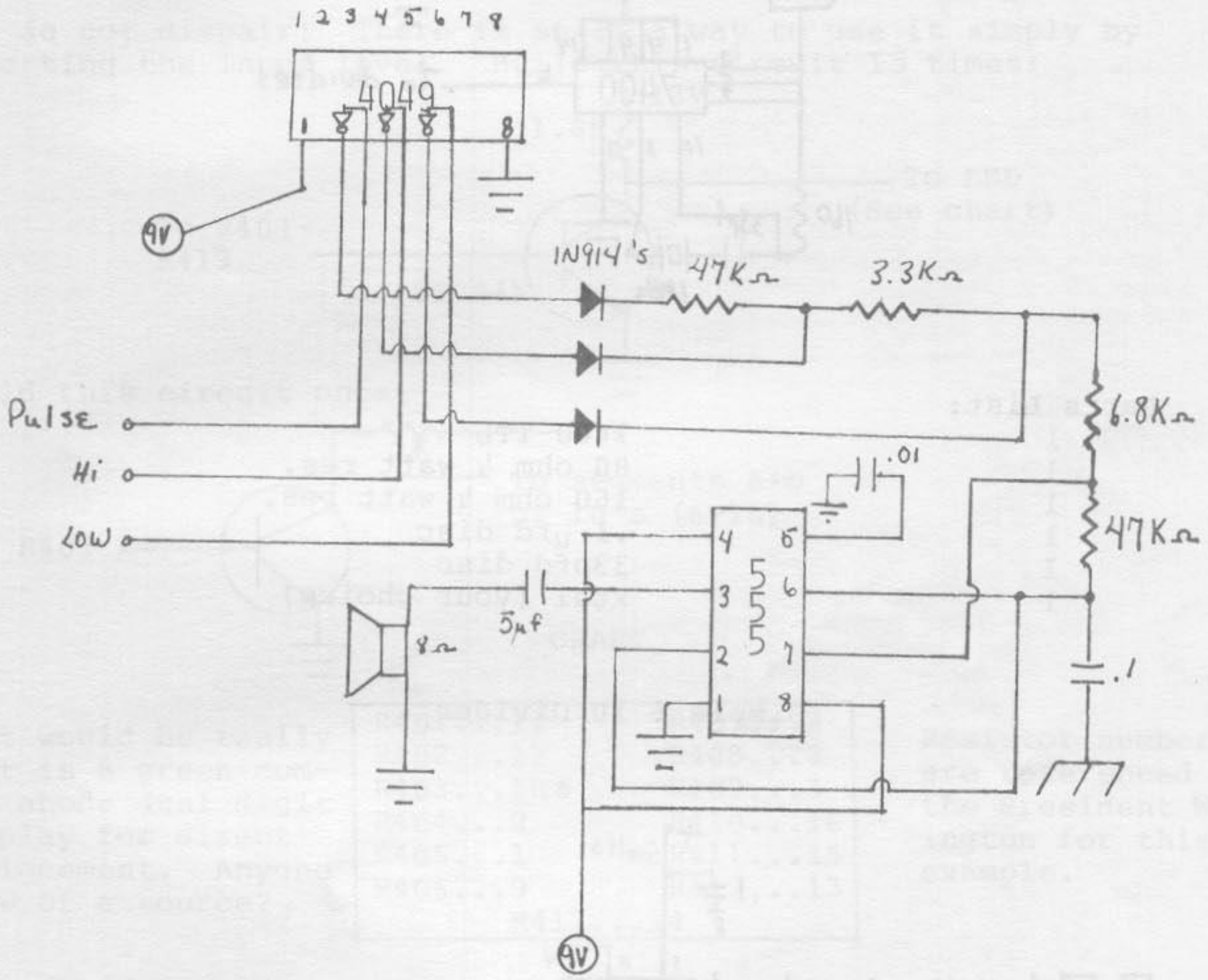

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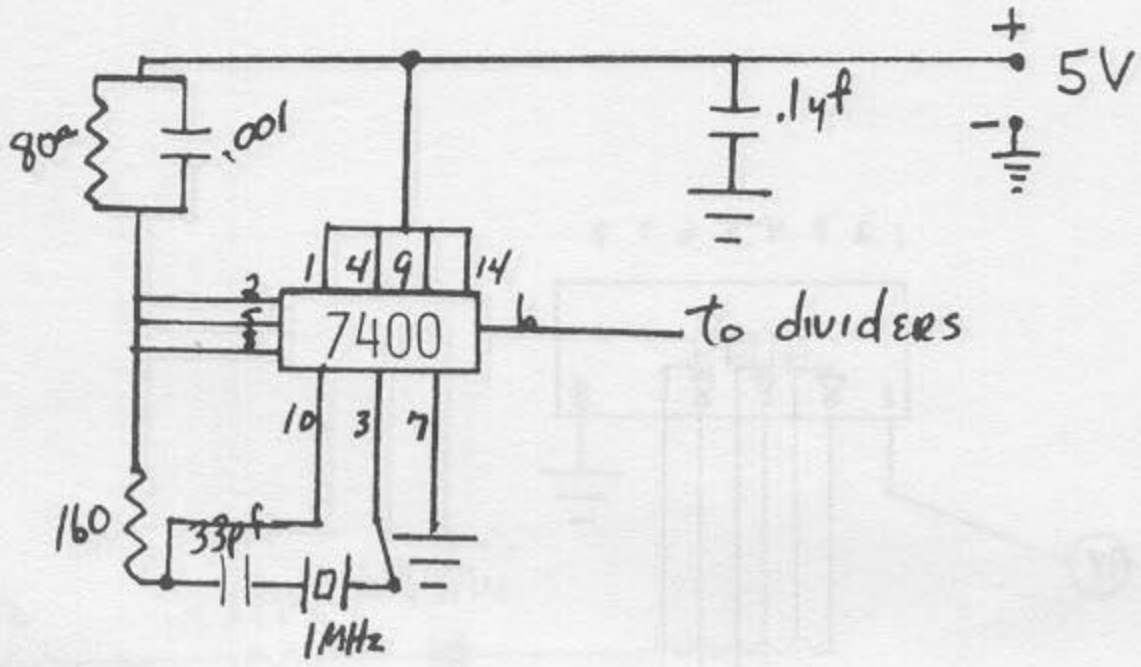
HANDY TTL CIRCUITS

Easy to build Reference, or Marker OSC



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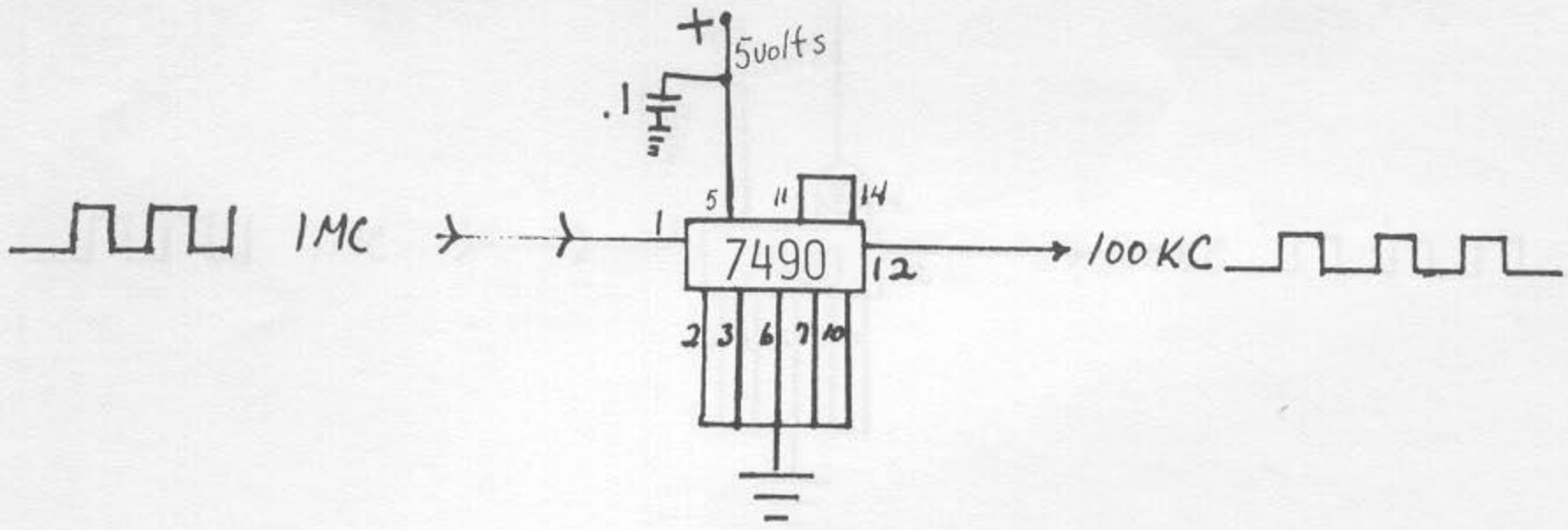
Simple ÷ 10 Divider



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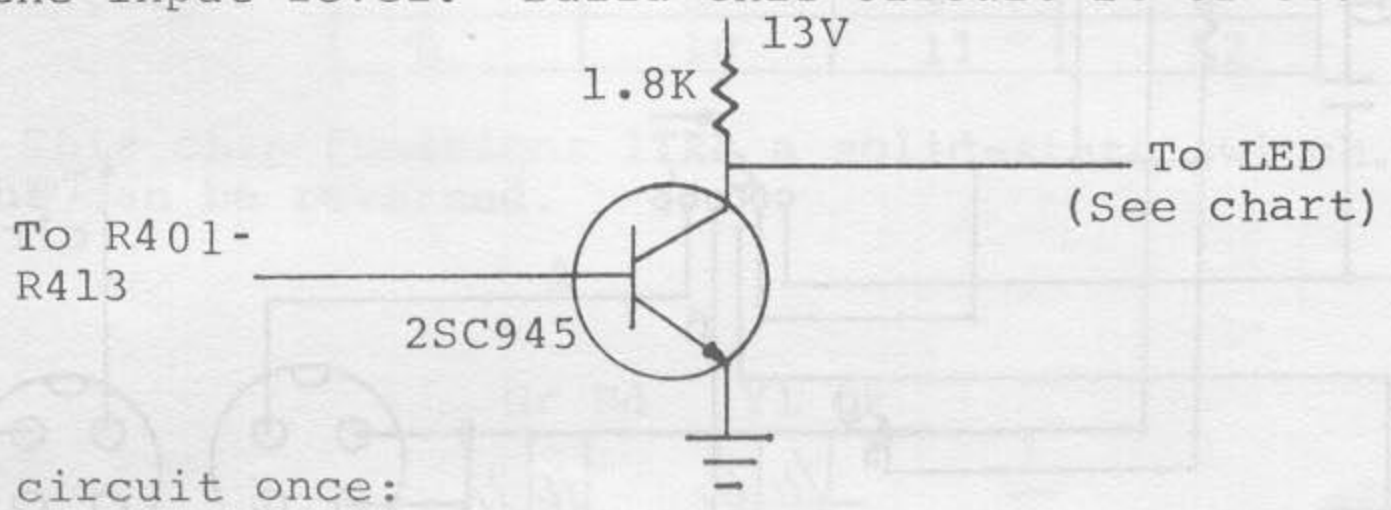
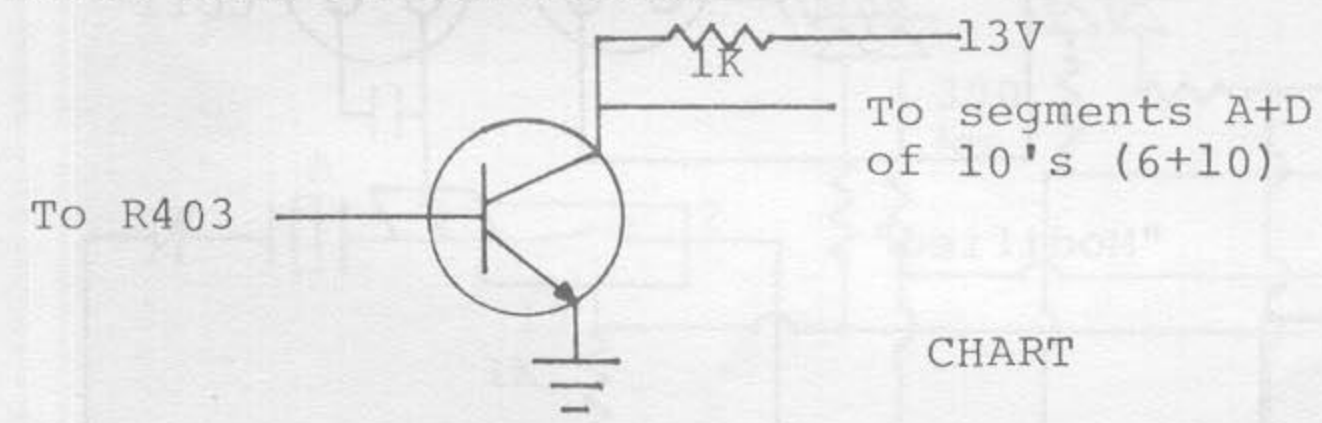
READOUT MODIFICATION

Here is a cute idea on how to eliminate Red LED washout on bright days. A green 2 digit LED is available from Midland (used in 7001 SSB), that can replace your red ones. The only catch is that the red readouts that are commonly used are common anode and the green one from Midland is common cathode.

But do not dispair! There is still a way to use it simply by inverting the input level. Build this circuit 13 times:



Build this circuit once:

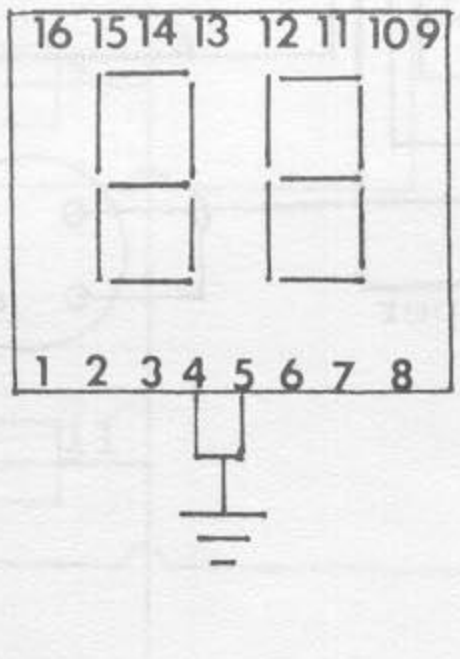


CHART

What would be really neat is a green common anode dual digit display for direct replacement. Anyone know of a source?

R401...11	R407...8
R402...12	R408...7
R403...10,6	R409...3
R404...2	R410...16
R405...1	R411...15
R406...9	R412...13
R413...14	

Resistor numbers are referenced to the President Washington for this example.



Midland Part

Number 77-202020

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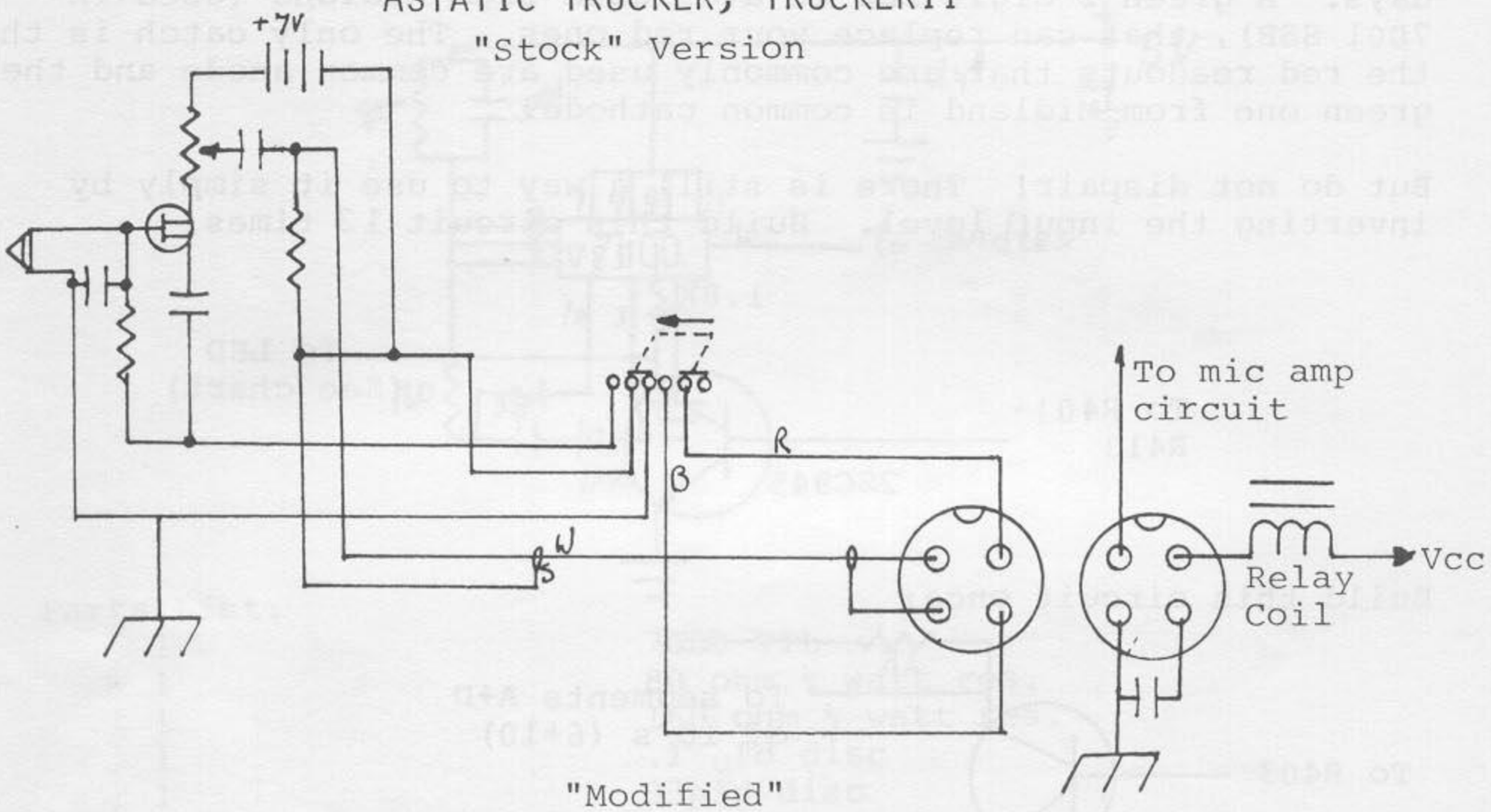
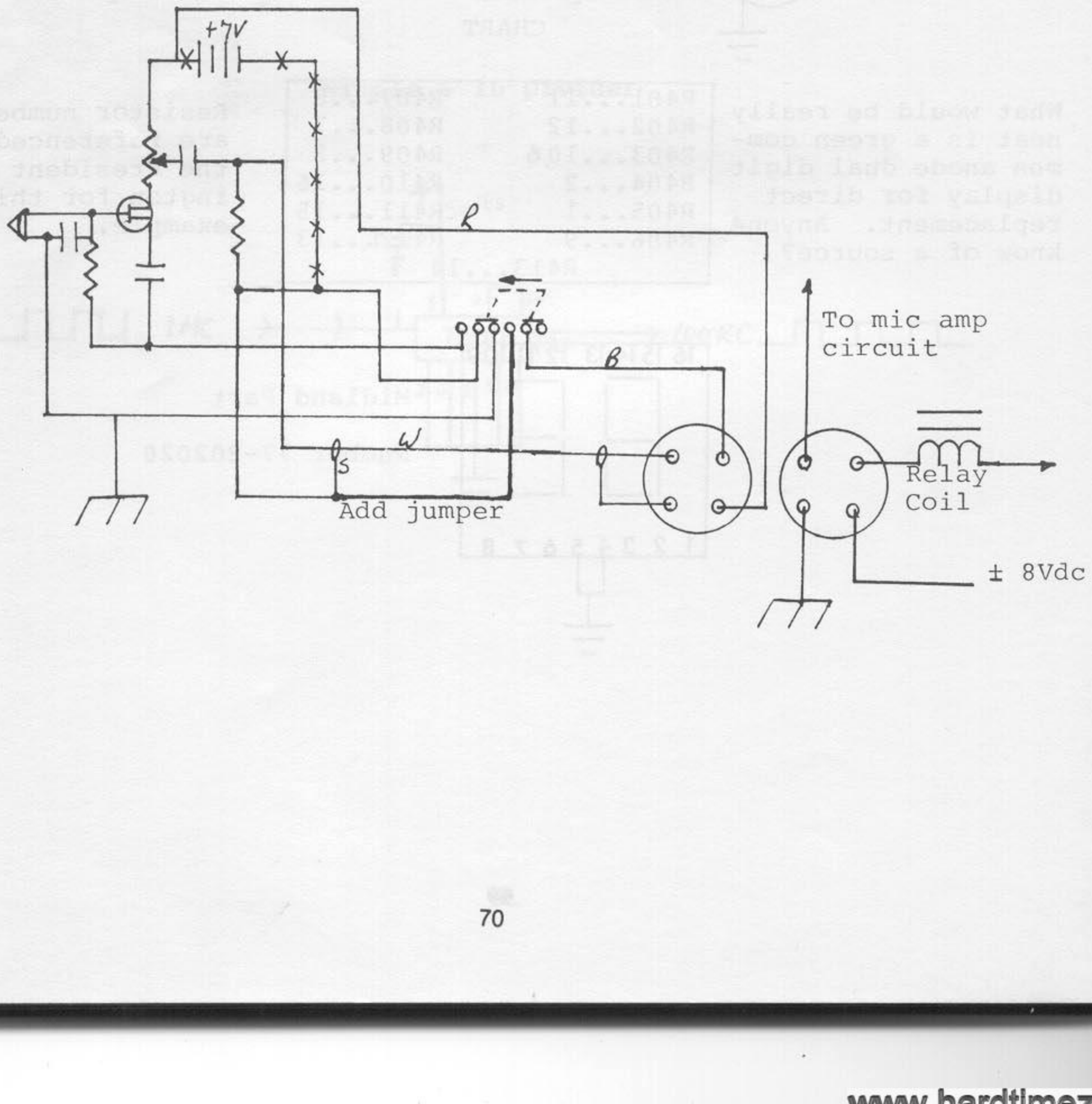
SET POWERED CB MIC

ASTATIC TRUCKER, TRUCKERII

"Stock" Version



"Modified"



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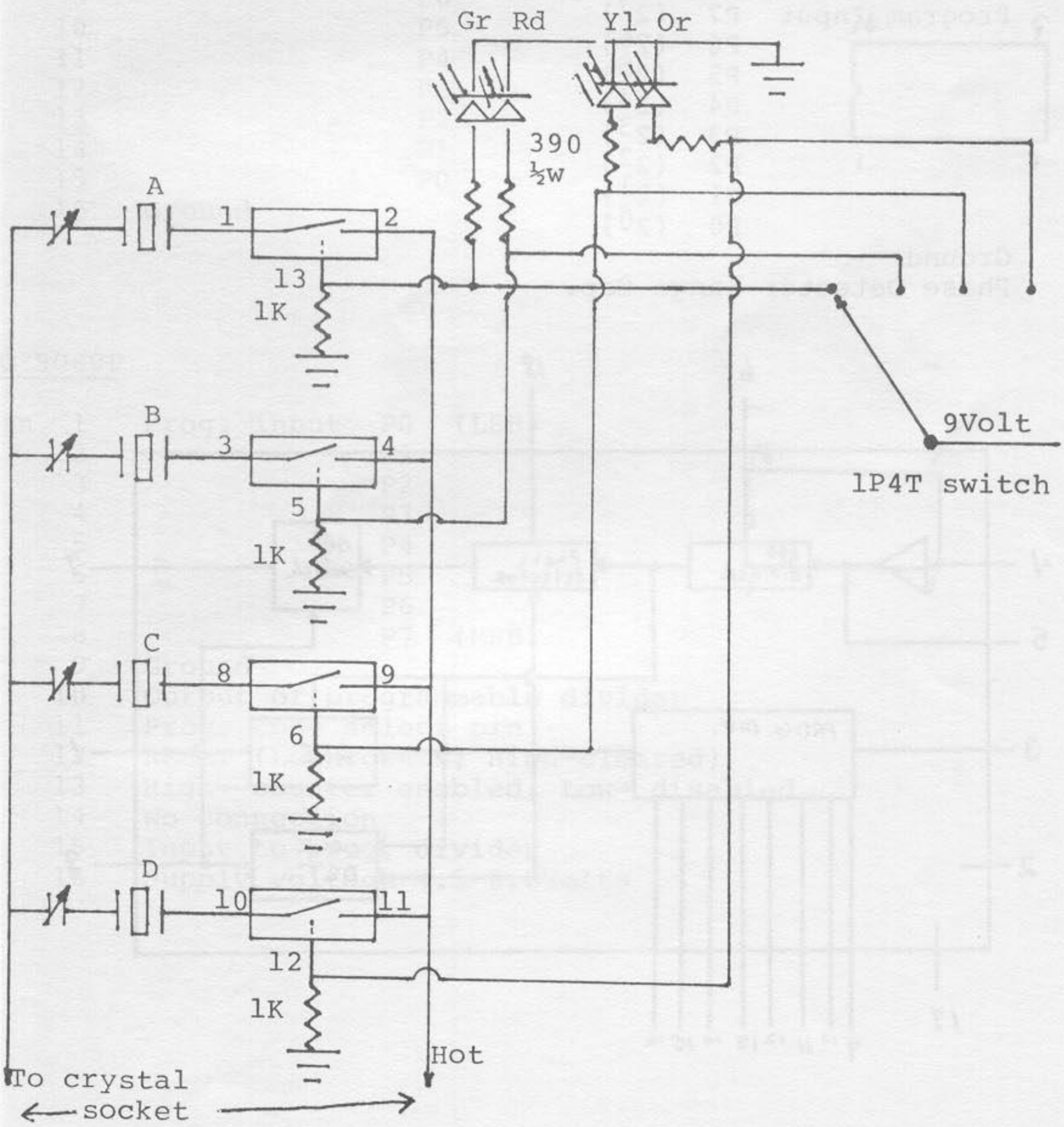
CD4066 Quad Bi-Lateral Switch

This chip has been around a good while and finds a very practical application in the area of Xtal switching. Etch a PC board and you can have a very compact little circuit. Pin-out is as follows:

7- Ground.
14- +3-15Volts

Switch	in/out	in/out	control
A	1	2	13
B	3	4	5
C	8	9	6
D	10	11	12

This chip functions like a solid-state switch.
Note: In/Out can be reversed.



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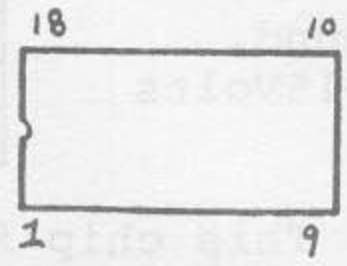
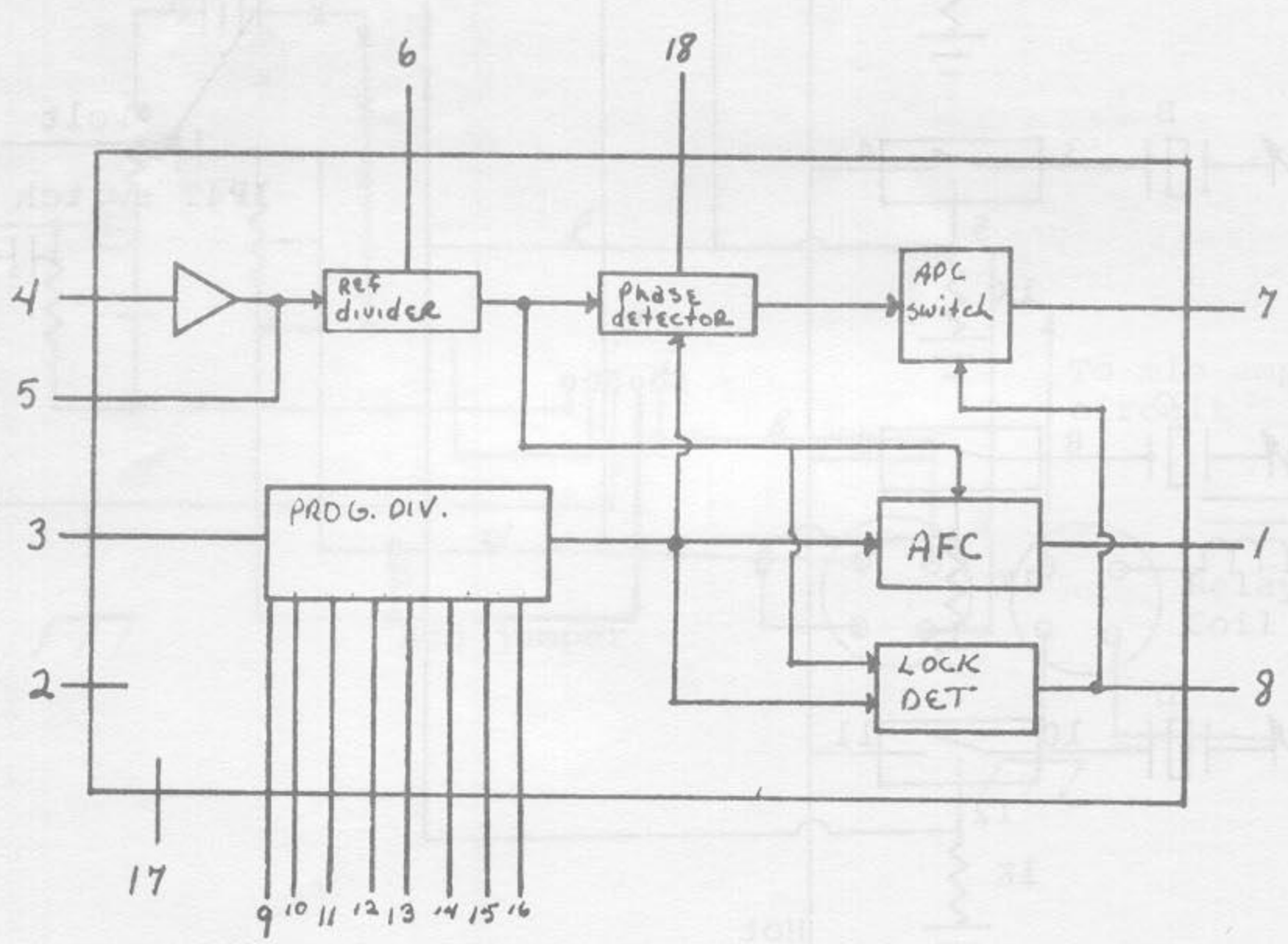
PLL PINOUT DIAGRAMS

REC 86345



PIN	1	Auto. Freq. Control
	2	Supply Voltage
	3	VCO input
	4	Ref. Xtal, input
	5	Ref. Xtal, output
	6	10/5 KC Select
	7	Auto. Phase Control
	8	Lock Detector Output
	9	Program Input P7 (2^7)
	10	P6 (2^6)
	11	P5 (2^5)
	12	P4 (2^4)
	13	P3 (2^3)
	14	P2 (2^2)
	15	P1 (2^1)
	16	P0 (2^0)
	17	Ground
	18	Phase Detector Range Cap.



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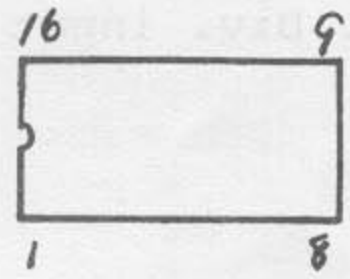
PLL PINOUT DIAGRAMS (CONT)

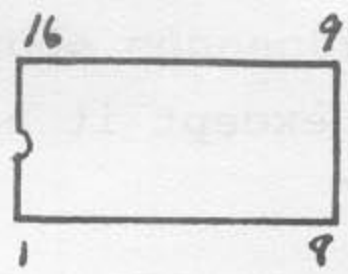
PLL 02A

Pin	1	Voltage Supply
	2	Prog. Div. Input
	3	Ref. Freq. Input
	4	Ref Dev. Output(10KC)
	5	Output of Charge Pump
	6	Lock Detector Output-Normally high (Low-Xmit stop)
	7	Program Input P8
	8	P7
	9	P6
	10	P5
	11	P4
	12	P3
	13	P2
	14	P1
	15	P0
	16	Ground



TC 5080P

Pin	1	Prog. input P0 (LSB)
	2	P1
	3	P2
	4	P3
	5	P4
	6	P5
	7	P6
	8	P7 (MSB)
	9	Ground
	10	Output of programmable divider
	11	Prog. code select pin
	12	RESET (Low-counts; High-cleared)
	13	High- counter enabled; Low- disabled
	14	No connection
	15	Input to prog. divider
	16	Supply voltage 4.5-8.0Volts



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PLL PINOUT DIAGRAM (CONT)

TC9106P

This monster uses a read-only memory, derived from the LED 7 segment code. 40 channels only.

1. V+.
2. Ref OSC input.
3. No conection.
4. Lock detector.
5. NC.
6. NC.
7. Phase detector.
8. Transmit/Receive IF shift.
9. Prog. Div. input
10. P0.
11. P1.
12. P2.
13. P3.
14. P4.
15. P5.
16. P6.
17. P7.
18. Ground.

TC9109P

Same as above except it has on chip loop filter input and output, pins 5, and 6.

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03A Chip-

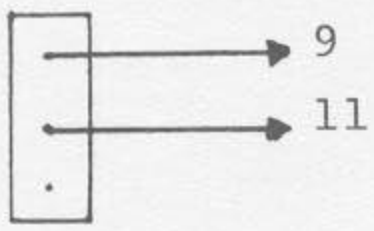
1. V+
2. Qin (10.240)
3. LDl Kills output if channel select is improperly positioned between channels.
4. LD3 Loop Lock detector output
5. LD2 Inverter
6. Do Ø detector output
7. TIR
8. Fin Prog. div. input ≦ 7MHz
9. P6
10. P5
11. P4
12. P3
13. P2
14. Pl
15. P0

Programming inputs to code connection

16. Ground

Extra Channels-

Replace 03A with 02A
(rewiring necessary)
for extra channels.



1-9 26.905-26.805
10-22 27.435-27.585

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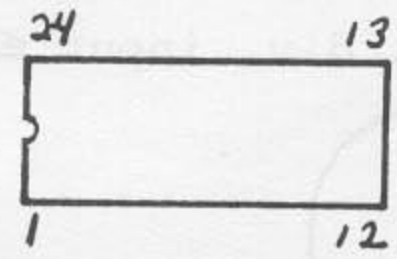
PLL PINOUT DIAGRAMS (CONT)

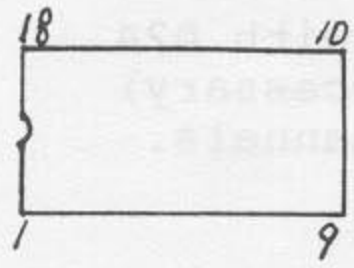
UPD 858C

Pin	1	Lock detector output. Normally low
	2	Output of Charge Pump-correct VCO
	3	Input low pass filter
	4	Output low pass filter
	5	Ref. Input to phase det./Charge Pump
	6	Output Ref. divider
	7	Ref. Freq. Select pin H÷1024; L÷2048
	8	5.12 MHz output
	9	Input Ref Osc.
	10	Output Ref Osc (10.240)
	11	Programmable divider input
	12	Supply voltage
	13	Program Input P0
	14	P1
	15	P2
	16	P3
	17	P4
	18	P5
	19	P6
	20	P7
	21	P8
	22	P9
	23	Ground
	24	10Kc Test Point



MM 55106

Pin	1	+5V
	2	Prog. Div. Input
	3	Ref. OSC. Inc. (10.240)
	4	Ref. OSC. Output
	5	5.12 MHz output
	6	Ref. Freq. Select
	7	Ø det. output to VCO
	8	Lock det. output
	9	Prog. Input MSB-P8
	10	P7
	11	P6
	12	P5
	13	P4
	14	P3
	15	P2
	16	P1
	17	LSB P0
	18	Ground



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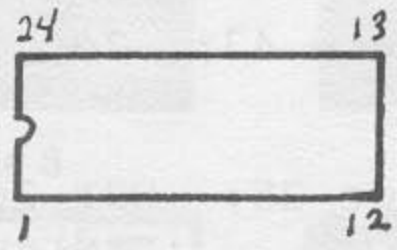
PLL PINOUT DIAGRAMS (CONT)

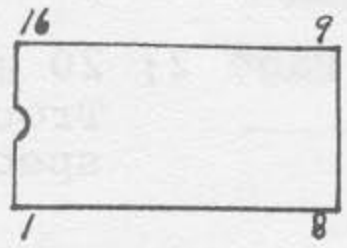
UPD 861C

Pin	1	Program Inputs	P0
	2		P1
	3		P2
	4		P3
	5		P4
	6		P5
	7		P6
	8		P7
	9	5.12MHz	
	10	Ref. Osc (10.240) input	
	11	Ref. Osc. output	
	12	Supply Voltage	
	13	Input to programmable divider, greater than 3MHz	
	14	Program input mode switch	
	15	Output of prog. divider	
	16	Phase detector input	
	17	Output Ref divider-10Kc	
	18	Phase det. input	
	19	Output of active filter amp.	
	20	Input of active filter amp.	
	21	Error signal output of phase det.	
	22	Loop locked - High level	
	23	Ground	
	24	Inhibit output normal - Low level	



MN6040

Pin	1	+5 V
	2	Prog. Div. input
	3	Ref. divider input
	4	Ref divider input
	5	Ø det. output
	6	Lock det. output
	7	Program inputs P8 MSB
	8	P7
	9	P6
	10	P5
	11	P4
	12	P3
	13	P2
	14	P1
	15	P0
	16	Ground



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"OOPS, WE GOOFED"

Vol. 8, Page 52;

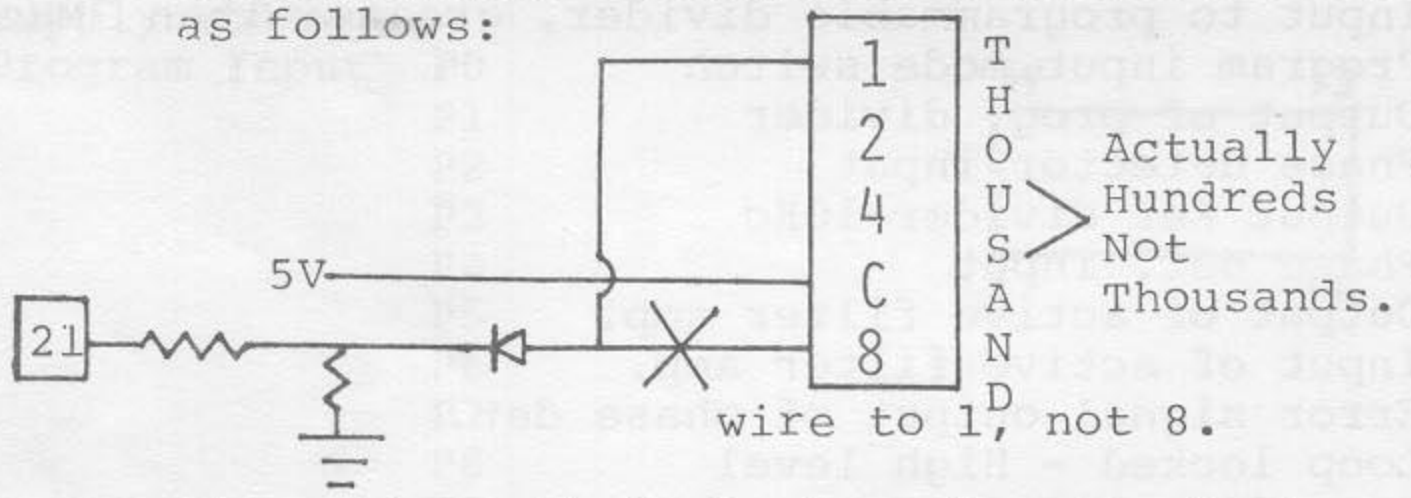
Under switch 2, D should read: "Gray wire that was at B.S. J."

Vol. 7, Page 53; Realistic TRC-425. Do not cut collector of Q509. AMC; VR8. SQ Range; VR5. RF Gain Range; VR1. S Meter; VR3. RF Meter; VR11.

Vol. 7, Page 43; 200 channel conversion. Switch designations should be: Gr--Yw--Rd, not Yw--Gr--Rd.

Vol 3. Page 25; CPI 2000 (80 channel conversion). IC marked in drawing for 5KC drop is really IC-G, not IC-C. Pinout is correct.

Vol 6, Page 32, and Vol 7, Page 63; Thumbwheel 200 Channel Update. Thumbwheel switches are BCD type. Also, the switch marked "Thousands", should be connected as follows:



Also, the method of channel entry is in a code from 000-199 as shown on page 34 of Vol 6. You can't dial in "785" for 27.785. Rather, you must dial in "173" as per chart. The Tens, Hundreds, Thousands should really be Ones, Tens, Hundreds.
Note: The thousands switch could be a simple SPST switch instead of the more expensive thumbwell type.

Vol. 10, Page 2; 20 mile simulator has been eliminated from The Trouble Shooter because of unavailablity of special parts.

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